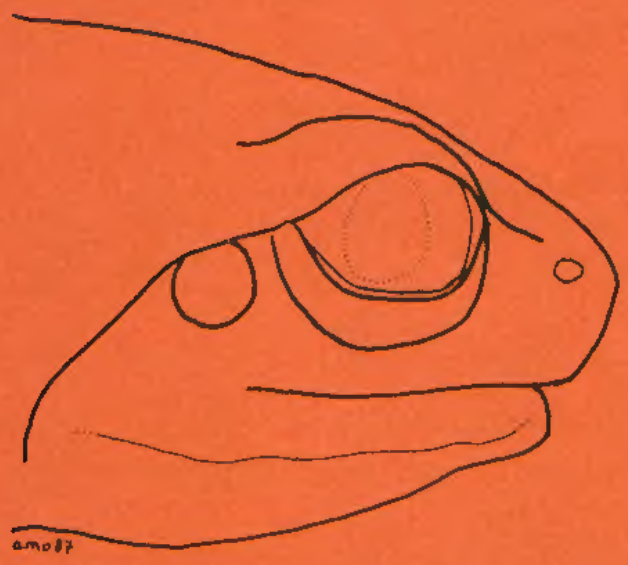
Pr 6118

ISSN 0753-4973

ALYTES



Mars-Juin 1987

BIBL. DU MUSEUM PARIS

Volume 6, fascicules 1&2

Source : MNHN, Paris

SOCIÉTÉ BATRACHOLOGIQUE DE FRANCE
(Société pour l'Étude et la Protection des Amphibiens)

SIÈGE SOCIAL

Laboratoire des Reptiles et Amphibiens, Muséum national d'Histoire naturelle,
25 rue Cuvier, 75005 Paris, France.

CONSEIL D'ADMINISTRATION POUR 1987

Président : Jean-Jacques MORÈRE.
Vice-Président : Jean-Louis AMIET.
Secrétaire général (renseignements et demandes d'adhésion) : Alain DUBOIS.
Trésorière : Dominique PAYEN.
Membres : Alain COLLENOT, Michel DELAUGERRE, Edouard LEMÉE, Luck MARTIN-BOUYER, Manuel POLLS PELAZ et Jean-Paul RISCH.

ADHÉSION

La S.B.F. est ouverte à toute personne française ou étrangère intéressée par l'étude et la protection des Amphibiens ; écrire au Secrétaire général. La cotisation inclut le service du Bulletin d'information *Circalytes*.

TARIFS 1987

	Lieu de résidence	
	France	Etranger
Membres de la S.B.F. :		
Cotisation seule	100 F	100 F
Cotisation + abonnement à *Alytes*	170 F	180 F
Cotisation membre associé (conjoint, etc.)	40 F	40 F
Abonnement à *Alytes* pour les non-membres :		
Individus	100 F	130 F
Institutions	200 F	260 F
Supplément pour expédition d'*Alytes* par avion (membres et non-membres)	–	50 F

Achats au numéro et rachats d'anciennes séries d'*Alytes* : écrire au Sécrétaire général pour information.

MODALITÉS DE RÈGLEMENT

FRANCE. – Par chèque postal ou bancaire à l'ordre de "Société Batrachologique de France", adressé à notre Trésorière, ou par virement postal sur notre C.C.P. : "Société Batrachologique de France", C.C.P. 7976 90 K, Paris.

EUROPE. – Exclusivement par virement postal ou mandat postal, libellé en Francs Français et adressé à notre Compte Chèques Postal : "Société Batrachologique de France", C.C.P. 7976 90 K, Paris.

OUTSIDE EUROPE. – Please write to our General Secretary for information.

Source : MNHN, Paris

Pr 6118

ALYTES

INTERNATIONAL JOURNAL OF BATRACHOLOGY

Trimestriel **Volume 6**

Mars-Juin 1987 **Fascicules 1&2**

Alytes, 1987, **6** (1-2) : 1-9.

Miscellanea taxinomica batrachologica (II)

Alain DUBOIS

Laboratoire des Reptiles et Amphibiens,
Muséum national d'Histoire naturelle,
25 rue Cuvier, 75005 Paris, France

The Oriental frog genus *Microhyla* is shown to be heterogeneous. This genus is here divided into two subgenera, one of which includes two distinct species groups, and a new genus is erected for *M. inornata* and related forms.

Ordre **ANURA** Rafinesque, 1815 (Hogg, 1839)

Sous-ordre **RANOIDEI** Wilbrand, 1814 (Sokol, 1977)

Superfamille **RANOIDEA** Rafinesque-Schmaltz, 1814 (Gray, 1825) (Fitzinger, 1826) (Bolkay, 1919)

Famille **MICROHYLIDAE** (Fitzinger, 1843) Günther, 1858 (Noble, 1931) (Parker, 1934)

Sous-famille **MICROHYLINAE** (Fitzinger, 1843) Günther, 1858 (Noble, 1931)

LAURENT (1986) a suggéré de séparer en deux sous-familles, l'une orientale (Microhylinae) et l'autre américaine (Gastrophryninae), la sous-famille des Microhylinae de PARKER (1934). En attendant une analyse phylogénétique plus approfondie de ces groupes, nous le suivons partiellement ici, en accordant à ces taxons le rang de tribus, et les noms respectifs de Microhylini et de Gastrophrynini.

BIBL. DU MUSEUM PARIS

Bibliothèque Centrale Muséum

3 3001 00111578 0

Source : MNHN, Paris

Tribu MICROHYLINI (Fitzinger, 1843) Günther, 1858 (Noble, 1931) (emend. nov.)

Genre MICROHYLA Tschudi, 1838

Espèce-type. – *Microhyla achatina* Tschudi, 1838, par monotypie.

Discussion. – Dans sa révision des Microhylinae, PARKER (1934) incluait dans le genre *Microhyla* 15 espèces orientales et 11 espèces américaines. CARVALHO (1954 : 12-13) a suggéré que ce groupe était un rassemblement artificiel d'espèces issues de différentes lignées évolutives de Microhylinae dans lesquelles les clavicules et les procoracoïdes ont été perdus, et cet auteur a retiré les espèces américaines du genre *Microhyla*. Même restreint aux espèces orientales, ce genre est encore hétérogène, en termes morphologiques, comme l'ont déjà souligné plusieurs auteurs (PARKER, 1928 ; CARVALHO, 1954 : 13 ; LAURENT, 1986 : 753-754). Ayant eu l'occasion, de 1970 à 1984 au Népal et en Inde, et en 1986 en Thaïlande, d'observer en vie diverses espèces rapportées à ce genre (*M. annectens, M. berdmorei, M. butleri, M. heymonsi, M. ornata, M. pulchra* et *M. inornata*), nous avons été frappé par les différences d'habitus, de comportement et de chant entre *M. inornata* d'une part et les autres espèces de l'autre. Ces différences viennent s'ajouter à celles déjà mises en évidence par les auteurs cités ci-dessus concernant la morphologie, et nous amènent à placer *M. inornata* dans un genre distinct de *Microhyla*. De plus, nous proposons de diviser ce dernier genre en deux sous-genres, dont un comportant lui-même deux groupes d'espèces distincts. On trouvera ci-dessous de brèves diagnoses préliminaires de ces nouveaux taxons, qui feront ultérieurement l'objet de travaux plus approfondis.

En ce qui concerne l'espèce malgache décrite par GUIBÉ (1974 : 1188) sous le nom de *Microhyla palmata*, nous partageons l'avis de LAURENT (1986 : 744) selon lequel elle appartient à un autre genre et même sans doute à une autre sous-famille. Lors d'une visite récente au Muséum de Paris, Rose M.A. BLOMMERS-SCHLÖSSER nous a informé de son intention de nommer ce genre, qui ne sera donc pas discuté ici.

Diagnose. – CARVALHO (1954), suivi par NELSON (1972) et par la totalité des auteurs depuis, a retiré de *Microhyla* toutes les espèces américaines maintenues par PARKER (1934) dans ce genre, pour les placer dans plusieurs genres distincts, pour la plupart dans *Gastrophryne*. NELSON (1972) a donné une liste des différences entre *Microhyla* et *Gastrophryne*, sur laquelle il est inutile de revenir. Quant aux différences entre *Microhyla* et le nouveau genre décrit ci-dessous, elles sont mentionnées dans la diagnose de ce dernier.

Deux sous-genres peuvent être reconnus au sein du genre *Microhyla* dans sa nouvelle acception : on trouvera leurs synonymies, diagnoses et contenus ci-dessous.

DUMÉRIL & BIBRON (1841 : 613) ont créé le nom de remplacement *Micrhyla*, qu'ils ont francisé en "Micrhyle", pour ce genre. Nous adoptons ici ce dernier nom, allégé en "Micryle", pour désigner ces animaux en français.

Sous-genre MICROHYLA Tschudi, 1838

Microhyla Tschudi, 1838 : 28. – Espèce-type par monotypie : *Microhyla achatina* Tschudi, 1838 : 71.
Micrhyla Duméril & Bibron, 1841 : 613. – Nomen novum pro *Microhyla* Tschudi, 1838.
Dendromanes Gistel, 1848 : xi. – Nomen novum pro *Microhyla* Tschudi, 1838.

Source : MNHN, Paris

Diagnose. – Ce sous-genre se distingue du suivant par la présence à l'extrémité des doigts et orteils de disques différenciés, habituellement divisés par un sillon longitudinal médian sur leur face supérieure ; les phalanges terminales (au moins des orteils) sont en forme de T ; la palmure est généralement assez importante.

On peut encore reconnaître, à la suite de PARKER (1928, 1934), deux ensembles différents au sein de ce sous-genre, auxquels on peut attribuer la rang de groupes d'espèces. Dans le groupe *berdmorei*, le plus primitif, les palatins sont présents, les disques digitaux généralement bien développés et la palmure moyenne à importante. Dans le groupe *achatina*, probablement issu du précédent, les palatins sont absents, et le cartilage de la partie postérieure de la capsule nasale est partiellement ossifié ; les disques digitaux sont petits et la palmure réduite ; de plus, les deux têtards connus de ce groupe, ceux de *M. achatina* et de *M. heymonsi* (SMITH, 1916 ; PARKER, 1928, 1934 ; POPE, 1931), se distinguent de tous les autres têtards connus de *Microhyla* par leur bouche en entonnoir. On trouvera ci-dessous une liste des espèces que nous reconnaissons pour l'instant au sein de ces deux groupes d'espèces.

Espèces incluses. – (1) Groupe de *Microhyla (Microhyla) berdmorei* (Blyth, 1855) : *Microhyla (Microhyla) annamensis* Smith, 1923 ; *Microhyla (Microhyla) annectens* Boulenger, 1900 ; *Microhyla (Microhyla) berdmorei* (Blyth, 1855) ; *Microhyla (Microhyla) borneensis* Parker, 1926 ; *Microhyla (Microhyla) butleri* Boulenger, 1900 ; *Microhyla (Microhyla) fowleri* Taylor, 1934 ; *Microhyla (Microhyla) mixtura* Liu & Hu, 1966 ; *Microhyla (Microhyla) palmipes* Boulenger, 1897 ; *Microhyla (Microhyla) perparva* Inger & Frogner, 1979 ; *Microhyla (Microhyla) petrigena* Inger & Frogner, 1979 ; *Microhyla (Microhyla) superciliaris* Parker, 1928.

(2) Groupe de *Microhyla (Microhyla) achatina* Tschudi, 1838 : *Microhyla (Microhyla) achatina* Tschudi, 1838 ; *Microhyla (Microhyla) chakrapanii* Pillai, 1977 ; *Microhyla (Microhyla) fusca* Andersson, 1942 ; *Microhyla (Microhyla) heymonsi* Vogt, 1911 ; *Microhyla (Microhyla) zeylanica* Parker & Hill, 1948.

Sous-genre **DIPLOPELMA** Günther, 1859

Siphneus Fitzinger, 1843 : 33 (nec Brants, 1827 : 19). – Espèce-type par désignation originale : *Engystoma ornatum* Duméril & Bibron, 1841 : 745.
Diplopelma Günther, 1859 : 50. – Nomen novum pro *Siphneus* Fitzinger, 1843.
"*Scaptophryne*" Fitzinger, 1860 : 416, nomen nudum. – Espèce-type par monotypie : "*Scaptophryne labyrinthica*" Fitzinger, 1860 : 416, nomen nudum.
Copea Steindachner, 1864 : 286. – Espèce-type par monotypie : *Copea fulva* Steindachner, 1864 : 286.
Ranina David, 1871 : 76 (nec Lamarck, 1801 : 156). – Espèce-type par monotypie : *Ranina symetrica*[1] David, 1871 : 76.

Diagnose. – Ce sous-genre se distingue du précédent par l'absence de disques à l'extrémité des doigts et orteils ; les phalanges terminales sont simples ; la palmure est généralement réduite.

1. DAVID (1871 : 76, 77 ; 1872 : 85) a toujours écrit ce nom "*symetrica*", et non pas "*symmetrica*", comme l'ont écrit la plupart des auteurs ultérieurs, à la suite de BOULENGER (1882 : 166).

Source : MNHN, Paris

C'est probablement du groupe *achatina* du sous-genre *Microhyla* que le présent sous-genre est issu : comme chez celui-ci, le palatin est absent, et le cartilage de la partie postérieure de la capsule nasale est partiellement ossifié (PARKER, 1928) ; toutefois les têtards de *Diplopelma* sont dépourvus de la bouche spécialisée en entonnoir que possèdent les têtards connus du groupe *achatina* (PARKER, 1934).

Espèces incluses. – *Microhyla (Diplopelma) okinaventris* Stejneger, 1901 ; *Microhyla (Diplopelma) ornata* (Duméril & Bibron, 1841) ; *Microhyla (Diplopelma) picta* Schenkel, 1901 ; *Microhyla (Diplopelma) pulchra* (Hallowell, 1860) ; *Microhyla (Diplopelma) rubra* (Jerdon, 1853).

Genre MICRYLETTA nov.

Espèce-type. – *Microhyla inornata* Boulenger, 1890 : 37.

Espèces incluses. – *Micryletta inornata* (Boulenger, 1890), avec les sous-espèces *Micryletta inornata inornata* (Boulenger, 1890) et *Micryletta inornata lineata* (Taylor, 1962) ; *Micryletta steinegeri*[2] (Boulenger, 1909).

Etymologie du nom générique. – Ce nom rappelle celui du genre voisin *Microhyla* ; la désinence *-etta* est destinée à évoquer le comportement sautillant de ces animaux.

Diagnose. – Les Micrylettes (*Micryletta*) se distinguent des Micryles (*Microhyla*) par un grand nombre de caractères, notamment les suivants.

(1) Chez *Micryletta*, le palatin est absent, et l'ethmoïde est très développé, sa zone antérieure bordant l'arrière et les côtés du choane interne (PARKER, 1928). Chez *Microhyla*, le palatin est présent (groupe *berdmorei*) ou absent (groupe *achatina*, sous-genre *Diplopelma*) ;

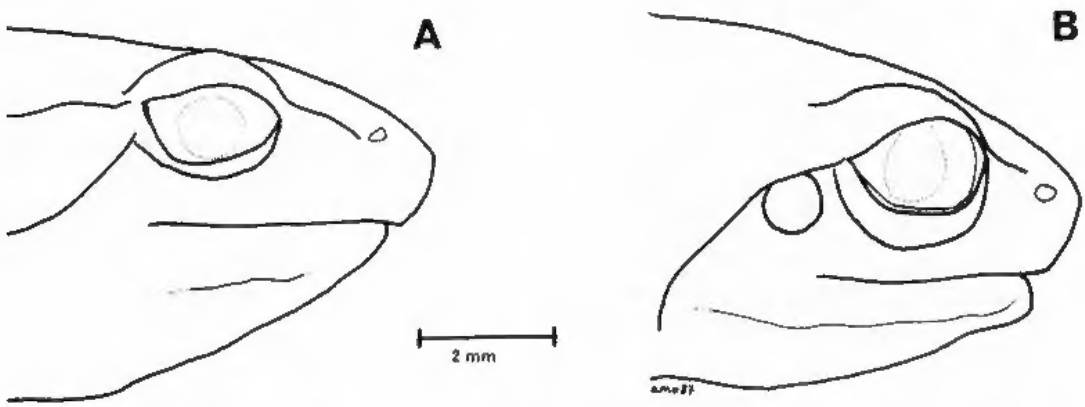


Fig. 1. – Têtes de profil. (A) *Microhyla heymonsi*, mâle adulte, MNHN 1987.2197, entre Nam Tok et Sai Yok, Kanchanaburi, Thaïlande. (B) *Micryletta inornata*, mâle adulte, MNHN 1987.2442, Khao Chong, Trang, Thaïlande.

2. BOULENGER (1909 : 494) a écrit le nom de cette espèce "*steinegeri*", ce qui signifie qu'il avait latinisé le nom de STEJNEGER en STEINEGERUS, comme il en avait le droit le plus absolu. Le nom "*stejnegeri*" employé par la plupart des auteurs ultérieurs est une émendation injustifiée du nom original, dont l'auteur est NIEDEN (1926 : 28, 35).

Source : MNHN, Paris

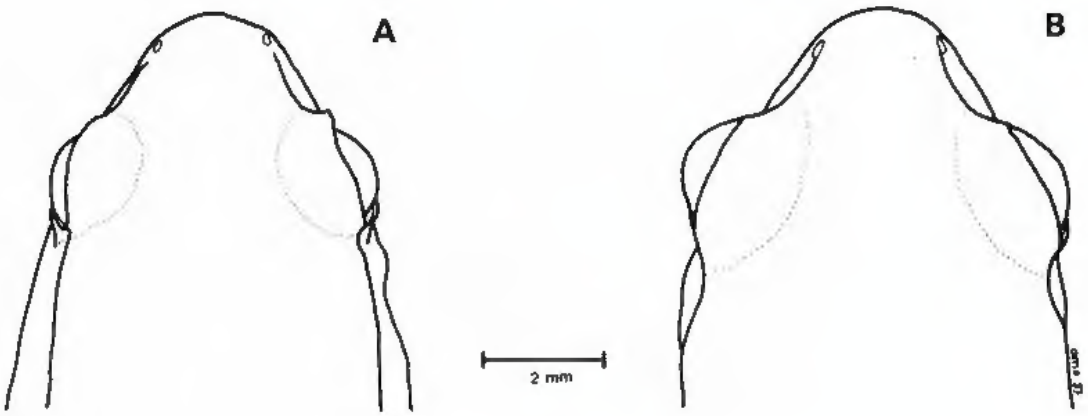


Fig. 2. – Têtes en vue dorsale. Mêmes spécimens que dans la fig. 1.

l'ethmoïde est toujours séparé du choane interne par le palatin (quand il existe) ou par une zone de cartilage partiellement ossifié, et il ne s'étend pas latéralement par rapport au choane interne (PARKER, 1928).

(2) La forme de la tête est différente dans les deux genres. Le museau est plus long que l'oeil et nettement proéminent chez les Micryles, tandis qu'il est plus court que l'oeil et peu proéminent chez les Micrylettes (fig. 1). En vue dorsale, la tête des Micryles s'élargit régulièrement depuis l'extrémité du museau jusqu'en arrière des yeux, alors que chez *Micryletta* la tête cesse de s'élargir au niveau des yeux (fig. 2). La région loréale est plus ou moins oblique chez les Micryles, et quasi-verticale chez *Micryletta*.

(3) Le tympan est nettement visible chez *Micryletta*, alors qu'il est caché sous la peau chez *Microhyla* (fig. 1).

(4) La main a une forme différente dans les deux genres. Chez *Micryletta*, le premier doigt n'est que légèrement plus court que le second, qui n'est lui-même que modérément plus court que le troisième (fig. 3). Chez les Micryles, le troisième doigt est très long, et le premier est bien plus court que le second (fig. 3) ; la tendance au raccourcissement du premier doigt va même très loin chez deux espèces de Bornéo du groupe *berdmorei*, *M. perparva* et *M. petrigena*, où ce doigt est quasiment absent (INGER & FROGNER, 1979).

(5) La paume de la main des Micrylettes est couverte de nombreux tubercules semblables aux tubercules sous-articulaires des doigts et aux tubercules palmaires habituels des Anoures (fig. 3) : des tubercules similaires ont été décrits chez divers Ranidae orientaux par INGER (1954, 1966), qui estime qu'ils doivent faciliter le comportement grimpeur de ces espèces. Des tubercules surnuméraires semblables sont également parfois visibles, quoique moins nets et développés, sur le métatarsien de certains orteils chez certains spécimens de *Micryletta*. Chez les Micryles en revanche, de telles structures sont généralement absentes sur les mains et les pieds, parfois seulement esquissées sur les mains (fig. 3).

(6) Les extrémités des doigts et orteils des Micrylettes sont dépourvues de disques, et les phalanges terminales simples (PARKER, 1928), comme dans le sous-genre *Diplopelma*, alors que dans le sous-genre *Microhyla* s. str. des ventouses et des phalanges terminales en T sont présentes.

Source : MNHN, Paris

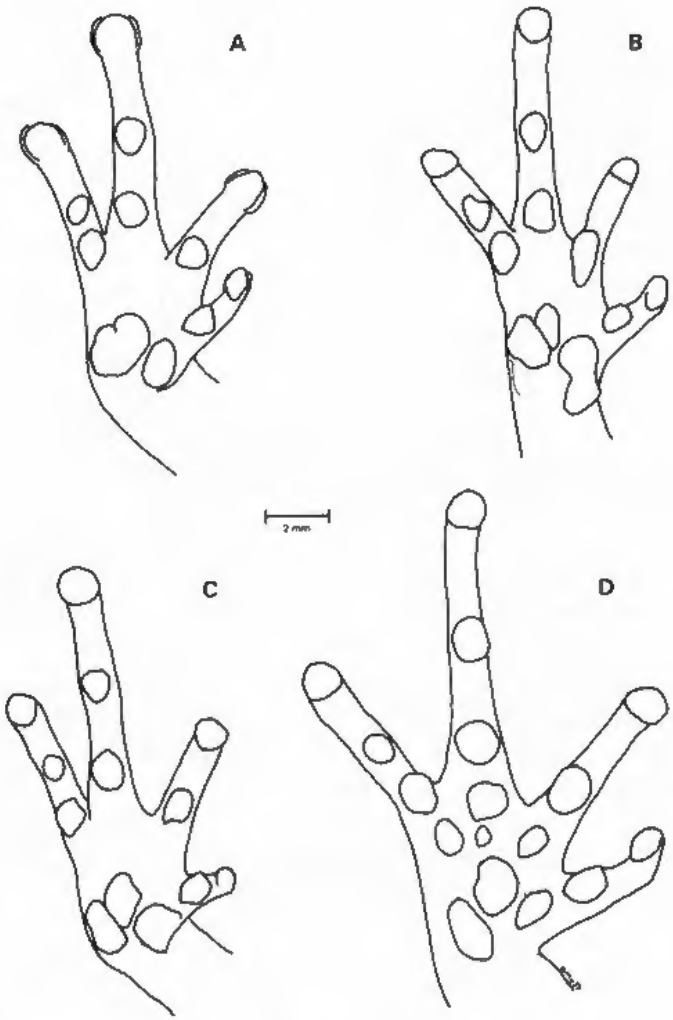


Fig. 3. – Mains en vue ventrale. (A) *Microhyla butleri*, mâle adulte, MNHN 1987.2284, Khao Chong, Trang, Thaïlande. (B) *Microhyla heymonsi*, mâle adulte, MNHN 1987.2197, entre Nam Tok et Sai Yok, Kanchanaburi, Thaïlande. (C) *Microhyla berdmorei*, femelle juvénile, MNHN 1987.2246, Khao Yai, Nakhon Nayok, Thaïlande. (D) *Micryletta inornata*, mâle adulte, MNHN 1987.2442, Khao Chong, Trang, Thaïlande.

(7) La palmure est totalement absente chez les Micrylettes, alors qu'elle est toujours présente, quoique parfois réduite à un rudiment de membrane, chez les Micryles.

(8) Les pattes postérieures sont plus longues chez les Micryles que chez les Micrylettes.

(9) Le pattern dorsal de toutes les espèces de *Microhyla* suit un même "modèle", avec un dessin médio-dorsal symétrique plus ou moins développé et net, mais toujours reconnaissable, et parfois une ligne médio-dorsale fine. Ce dessin n'est pas reconnaissable, même "déformé", chez les Micrylettes : en revanche chez ces dernières il existe sur le dos des lignes ou bandes foncées longitudinales plus ou moins complètes, qui n'ont pas d'équivalent chez les Micryles.

Source : MNHN, Paris

(10) En vie, le ventre des Micryles est entièrement pigmenté, blanc ou jaune nacré, habituellement sans taches (sauf sur les bords), tandis que celui des Micrylettes est totalement ou partiellement (petites taches sur fond blanc nacré) translucide rosâtre, les viscères apparaissant à travers ces zones de peau non pigmentée.

(11) Les animaux des deux groupes ont non seulement des habitus différents, qui frappent dès le premier abord sur le terrain, mais également des comportements fort dissemblables. Le déplacement habituel des Micryles se fait par petits bonds, alors que les Micrylettes marchent plutôt, à la manière de certains *Bufo*. Lorsque ces animaux sont inquiétés, les Micryles fuient généralement à terre à l'aide d'un très grand bond (parfois de plus d'un mètre, chez les grandes espèces comme *M. berdmorei* ou *M. pulchra*), à l'arrivée duquel l'animal se tient totalement immobile sur le sol, où il est souvent impossible de le retrouver et de le distinguer de la terre et de la végétation, tant il est bien camouflé par sa coloration ; dans la même situation en revanche, les Micrylettes s'enfuient généralement par une succession très rapide de petits sauts non séparés par des haltes, et se dirigent souvent vers une mare où elles plongent et disparaissent sous l'eau.

(12) Le poste de chant des Micryles est varié : souvent simplement à même le sol, généralement dans une zone herbeuse, parfois assez loin de l'eau ; plus rarement perché dans la végétation riveraine ou aquatique, ou même parfois flottant dans l'eau (LIU, 1950 : 251). Les Micrylettes chantent plus rarement à terre, mais plus souvent perchées, parfois très haut, dans la végétation du bord de l'eau ou, préférentiellement semble-t-il, dans la végétation aquatique dont les tiges ou branches émergent de l'eau et surplombent celle-ci. Les chants des Micryles sont variés, mais consistent tous en une répétition plus ou moins rapide de notes généralement graves : les bandes de fréquences dominantes des chants de six espèces de *Microhyla* décrits par HEYER (1971), NELSON (1973) et DUBOIS (1977) se situent entre 1200 et 4500 Hz. En revanche, le chant de *Micryletta inornata* a un "aspect" très différent : il se présente à l'oreille humaine comme une sorte de sifflement aigu, que HEYER (1971 : 67) compare à un chant de grillon. HEYER (1971) a présenté une analyse de ce chant, dont la bande de fréquence dominante se situe entre 4400 et 6500 Hz.

Discussion. – Comme cela a été souvent souligné (p. ex. LAURENT, 1987 : 2), l'atrophie ou la perte d'une structure ne constitue pas un bon critère de proche parenté phylogénétique entre espèces différentes, puisqu'elle peut s'être produite indépendamment dans des lignées distinctes. Le genre *Microhyla* tel que le concevait PARKER (1934) reposait principalement sur l'absence des clavicules, des procoracoïdes et de l'omosternum. Comme l'ont souligné CARVALHO (1954) et LAURENT (1986), la perte de ces os a pu avoir lieu à plusieurs reprises et dans différentes lignées de Microhylinae. Les caractères (morphologie, comportement, chant) de *Micryletta* sont fondamentalement différents de ceux de *Microhyla* et nous pensons que les deux genres sont probablement d'origine phylogénétique distincte au sein de la sous-famille, contrairement à ce qu'estimait PARKER (1928), pour qui *M. inornata* représentait l'aboutissement d'une lignée dont les espèces que nous plaçons dans le groupe de *M. berdmorei* seraient les représentants actuels les plus primitifs. Une analyse cladistique de la sous-famille sera nécessaire afin de préciser les affinités phylogénétiques des deux genres.

La nature distincte des deux genres est particulièrement frappante pour qui a l'occasion de les observer en vie dans la nature, et c'est peut être ce qui explique que GRESSITT (1938) ait ressenti le besoin de placer le spécimen unique de Micrylette qu'il avait récolté à

Source : MNHN, Paris

Formose dans un autre genre que *Microhyla*. Il rapporta ce spécimen au genre *Rana*, et le décrivit comme espèce nouvelle sous le nom de *Rana gracilipes*. MATSUI & BUSACK (1985) ont récemment placé ce nom dans la synonymie de *M. inornata*. Pour notre part, nous suivons ici provisoirement BOULENGER (1909) pour reconnaître la forme de Taiwan comme une espèce distincte *Micryletta steinegeri*, nom dont *Rana gracilipes* est synonyme. Nous adoptons également pour l'instant, en attendant une étude plus approfondie de la variation géographique chez *Micryletta inornata*, les deux sous-espèces *inornata* et *lineata* reconnues par TAYLOR (1962) au sein de celle-ci.

REMERCIEMENTS

Nous avons plaisir à remercier M. Jarujin NABHITABHATA pour l'aide qu'il nous a apportée en Thaïlande, notamment en nous donnant la possibilité d'étudier les Amphibiens dans plusieurs parcs nationaux. Le travail sur le terrain dans ce pays a bénéficié de la collaboration de Mlle Annemarie OHLER et de MM Jarujin NABHITABHATA et Jean-Paul RISCH. Les dessins qui illustrent ce travail ont été réalisés par Mlle Annemarie OHLER.

RÉFÉRENCES BIBLIOGRAPHIQUES

BOULENGER, G. A., 1882. – *Catalogue of the Batrachia Salientia s. Ecaudata in the collection of the British Museum*. London, Taylor & Francis : i-xvi + 1-503, pl. I-XXX.

----- 1890. – List of the Reptiles, Batrachians, and freshwater Fishes collected by Professor Moesch and Mr. Iversen in the district of Deli, Sumatra. *Proc. zool. Soc. Lond.*, **1890** : 31-40.

----- 1909. – Descriptions of four new frogs and a new snake discovered by Mr. H. Sauter in Formosa. *Ann. Mag. nat. Hist.*, (8), **4** : 492-495.

BRANTS, A., 1827. – *Het geslacht der muizen door Linnaeus opgesteld, volgens de tegenswoordige toestand der wetenschap in familien, geslachten en soorten*. Berlyn, Akademische Boekdrukkery : i-xii + 1-190 + i-iii, 1 pl.

CARVALHO, A. L. DE, 1954. – A preliminary synopsis of the genera of American microhylid frogs. *Occ. Pap. Mus. Zool. Univ. Michigan*, **555** : 1-19, pl. I.

DAVID, A., 1871. – Rapport adressé à MM les Professeurs-Administrateurs du Muséum d'Histoire naturelle. *Bull. Nouv. Arch. Mus.*, **7** : 75-100.

----- 1872. – Journal d'un voyage dans le centre de la Chine et dans le Thibet oriental. *Bull. Nouv. Arch. Mus.*, **8** : 3-128.

DUBOIS, A., 1977. – Chants et écologie chez les Amphibiens du Népal. *In* : *Himalaya. Ecologie-Ethnologie*, Paris, CNRS, Colloques internationaux du CNRS, **268** : 109-118.

DUMÉRIL, A. M. C. & BIBRON, G., 1841. – *Erpétologie générale ou histoire naturelle complète des Reptiles*. Tome 8. Paris, Roret : i-vii + 1-792.

FITZINGER, F. I., 1843. – *Systema Reptilium*. Fasc. 1. *Amblyglossae*. Vindobonae, Braumüller & Seidel : 1-106 + i-ix.

----- 1860. – Die Ausbeute der österreichischen Naturforscher an Säugethieren und Reptilien während der Weltumsegelung Sr. Majestät Fregatte Novara. *Sber. Akad. Wiss. Wien*, **42** : 383-416.

GISTEL, J., 1848. – *Naturgeschichte des Thierreichs für höhere Schulen*. Stuttgart, Hoffmann : i-xi + 1-216 + i-iv, pl. I-XXXII.

GRESSITT, J. L., 1938. – Some amphibians from Formosa and the Ryu Kyu Islands, with description of a new species. *Proc. biol. Soc. Wash.*, **51** : 159-164.

GUIBÉ, J., 1974. – Batraciens nouveaux de Madagascar. *Bull. Mus. Nat. Hist. nat.*, (3), **171** (Zool. 116) : 1169-1192.

GÜNTHER, A., 1859. – *Catalogue of the Batrachia Salientia in the collection of the British Museum*. London, Taylor & Francis : i-xvi + 1-160, pl. I-XII.

Source : MNHN, Paris

HEYER, W. R., 1971. – Mating calls of some frogs from Thailand. *Fieldiana . Zool* , **58** . 61-82.

INGER, R. F., 1954. – Systematics and zoogeography of Philippine Amphibia. *Fieldiana Zool.*, **33** : 183-531

----- 1966 – The systematics and zoogeography of the Amphibia of Borneo *Fieldiana : Zool* , **52** . 1-402.

INGER, R.F. & FROGNER, K. J , 1979 – New species of narrow-mouth frogs (genus *Microhyla*) from Borneo. *Sarawak Mus. J.*, **27** : 311-322.

LAMARCK, J.B., 1801. – *Système des animaux sans vertebres, ou tableau général des classes, des ordres et des genres de ces animaux*. Paris, Deterville : i-viii + 1-432.

LAURENT, R. F., 1986. – Sous classe des Lissamphibiens (Lissamphibia). Systématique *In* · P -P GRASSÉ & M. DELSOL (éds.), *Traité de zoologie*, Tome XIV, *Batraciens*, Fasc I-B, Paris, Masson : 594-797.

---- 1987. – The systematic position of the genus *Afrixalus* Laurent (Hyperolidae). *Alytes*, **5** . 1 6.

LIU, C.-C., 1950. – Amphibians of Western China. *Fieldiana : Zool Mem* , **2** · 1-400, pl. 1-10

MATSUI, M. & BUSACK, S.D., 1985. – A reassessment of the taxonomic status of *Rana gracilipes* Gressitt, 1938 from Taiwan. *Herpetologica*, **41** : 159-160.

NELSON, C. E., 1972. – Systematic studies of the North American microhylid genus *Gastrophryne*. *J Herpet.*, **6** : 111-137.

----- 1973 – Mating calls of the Microhylinae : descriptions and phylogenetic and ecological considerations. *Herpetologica*, **29** : 163-176.

NIEDEN, F., 1926. – Amphibia. Anura II Engystomatidae. *Das Tierreich*, **49** i-xvi + 1-110.

PARKER, H. W., 1928. – The brevicipitid frogs of the genus *Microhyla*. *Ann. Mag. nat Hist* , (10), **2** · 473-499.

----- 1934. – *A monograph of the frogs of the family Microhylidae* London, British Museum . i-viii + 1-208

POPE, C. H., 1931. – Notes on amphibians from Fukien, Hainan and other parts of China *Bull Am. Mus. nat. Hist.*, **61** : 397-611, pl. I-X

SMITH, M., 1916 – Descriptions of five tadpoles from Siam. *J nat. Hist. Soc Siam*, **2** 37-43, 2 pl.

STEINDACHNER, F., 1864. Batrachologische Mittheilungen *Verhandl zool -bot. Ges. Wien*, **14** . 239-288, pl. IX-XVII.

TAYLOR, E. H , 1962 – The amphibian fauna of Thailand. *Kansas Univ Sci Bull* , **63** : 265-599

TSCHUDI, J. J., 1838 – *Classification der Batrachier, mit Berucksichtigung der fossilen Thiere dieser Abtheilung der Reptilien*. Neuchâtel, Petitpierre : 1-102, pl. I-VI

Source MNHN, Paris

Alytes, 1987, **6** (1-2) : 10.

Miscellanea nomenclatorica batrachologica (XVI)

Alain Dubois

Laboratoire des Reptiles et Amphibiens,
Muséum national d'Histoire naturelle,
25 rue Cuvier, 75005 Paris, France

A replacement name is proposed for *Xenobius* Zhang & Hu, 1985 (Hynobiidae), which is preoccupied by *Xenobius* Borgmeier, 1931 (Coleoptera).

Zhang & Hu (1985) ont récemment nommé *Xenobius* un nouveau genre d'Urodèles Hynobiidae de Chine. Malheureusement, ce nom ne peut être conservé pour ce genre, car le même nom avait été donné par Borgmeier (1931 : 358) à un genre de Coléoptères du Brésil. Nous proposons le nom de remplacement suivant, qui évoque l'origine chinoise de celui-ci, pour le genre d'Urodèles :

Sinobius nom. nov.

Nomen novum pro *Xenobius* Zhang & Hu, 1985 (nec Borgmeier, 1931).

Espèce-type, par désignation originale sous *Xenobius* Zhang & Hu, 1985 : *Sinobius melanonychus* (Zhang & Hu, 1985).

Diagnose : voir Zhang & Hu (1985).

Références bibliographiques

Borgmeier, T., 1931. – Sobre alguns coleopteros cortophilos do Brasil (Staphylinidae). *Rev. Entom.*, Sao Paulo, **1** : 355-367.

Zhang, F. & Hu, Q., 1985. – The aquatic evolution of Hynobiidae of China, with description of a new genus and a new species from Western Anhui. *Acta herpet. sin.*, **4** : 36-40.

Source : MNHN, Paris

Alytes, 1987, 6 (1-2): 11-17.

Le régime alimentaire des Amphibiens : méthodes d'étude

Pierre JOLY

Laboratoire de Biologie animale et Ecologie,
UA CNRS 367 Ecologie des Eaux douces,
Université Claude Bernard Lyon 1,
69622 Villeurbanne, Cédex,
France

For the ecologist, it is important to preserve the studied populations. The stomach-flushing method provides the stomach content without killing the animal and thus allows the researcher to know the amphibian diet without destroying the natural populations. After a review of the literature, the paper gives a detailed description of an equipment which has been extensively tested in the field for stomach flushing of urodeles and anurans. Such an equipment can be adapted to particular situations, like those involving a long walk. Advices are given for prey fixation and determination.

INTRODUCTION

Le régime alimentaire d'une espèce dans un milieu donné est un paramètre souvent indispensable pour la compréhension de la dynamique de la population concernée. La méthode la plus ancienne d'obtention des données consiste à sacrifier les animaux et à recueillir le contenu du tube digestif par dissection. L'avantage de cette méthode est de permettre une lecture directe du taux de remplissage de l'estomac. Mais elle présente par contre un inconvénient majeur d'ordre méthodologique : la progression récente des connaissances amène le chercheur à travailler de plus en plus à l'échelle des groupes fonctionnels de reproduction (dèmes) ou au niveau des individus. Chez les amphibiens, dans de nombreux cas, ces groupes ne comptent que quelques dizaines ou centaines d'individus. Tout prélèvement important peut alors entraîner rapidement des modifications profondes de la structure du groupe, voire la disparition de celui-ci.

Depuis une cinquantaine d'années ont été développées des méthodes non destructrices d'analyse du régime alimentaire dans plusieurs groupes zoologiques. On peut les classer selon trois types :

(1) Méthodes d'observation directe de l'animal en train de chercher sa nourriture ou pendant le transport d'une proie ; ce sont essentiellement des travaux sur les mammifères de grande taille (lion : SCHALLER, 1972) ou sur des oiseaux chassant en milieu découvert (chevalier gambette : GOSS-CUSTARD, 1977) ou photographiés au moment du retour au nid (mésange charbonnière : ROYAMA, 1970).

(2) Méthodes d'analyse des réjections orales ou anales : examen des pelotes de réjection des rapaces (LIBOIS, 1984) ou de sacs péritrophiques de larves de libellules (CHOVET, 1976).

Source : MNHN, Paris

(3) Méthodes de lavage gastrique : elles ont surtout été développées chez les poissons (ROBERTSON, 1945 ; SEABURG, 1957 ; GAUDIN, MARTIN & CAILLÈRE, 1981).

Les deux premières méthodes ne permettent pas de définir correctement le régime alimentaire chez les amphibiens. L'observation directe est difficile car la plupart des espèces sont nocturnes, ou chassent sous terre ou dans l'eau. On n'observe jamais de transport de proie. L'examen des excréments révèle la présence de certaines parties sclérifiées des proies (pièces buccales, griffes, capsules céphaliques, élytres) mais ne rend pas compte de l'ingestion de plathelminthes, annélides ou mollusques.

Le lavage de l'estomac ne présente par contre aucune difficulté majeure et a déjà été pratiqué par divers auteurs tant chez les Urodèles (FRASER, 1976 ; CHACORNAC & JOLY, 1985 ; GRIFFITHS, 1986), que chez les Anoures (LEGLER & SULLIVAN, 1979 ; OPATNRY, 1980 ; GITTINS, 1987). La cavité buccale et l'estomac ne forment pas entre eux de coude, ce qui permet le passage aisé d'un tube, même rigide. A la différence de nombreux poissons Cyprinidés, les amphibiens n'ont pas de dents pharyngiennes qui peuvent s'opposer au passage d'un tube (exemple du goujon : CASTRO, 1986). Enfin le cardia n'oppose pas de résistance à l'injection d'eau.

Le but de cet article est de présenter une revue des méthodes et du matériel utilisé, accompagnée de critiques et de conseils.

LE VIDANGEUR

Il se compose de trois parties :

(1) un réservoir de mise en pression de l'eau;

(2) un injecteur;

(3) un dispositif récepteur du contenu de l'estomac.

Le réservoir de mise en pression peut être une simple seringue (OPATNRY, 1980 ; GRIFFITHS, 1986), dont le faible encombrement facilite le transport sur le terrain. Un réservoir plus volumineux permet des manipulations plus sûres dans de meilleures conditions, en particulier pour les animaux de grande taille, ou bien lorsqu'on souhaite limiter la durée des manipulations (la digestion progresse chez les animaux que l'on a capturés et qui attendent d'être traités). Lorsque la situation du lieu de travail n'implique pas un long trajet à pied, j'utilise un pulvérisateur pour horticulture d'une capacité de 5 litres. Une pompe manuelle et une valve permettent d'ajuster la pression de façon à obtenir à la sortie de l'injecteur un débit qui ne doit pas dépasser 4 ml/s, sous peine de provoquer une déchirure de la paroi stomacale. La poignée de la lance fixée sur une planchette constitue une pédale qui permet de contrôler avec le pied d'injection d'eau et d'avoir les mains libres pour la manipulation des animaux. Pour un travail dans les Alpes qui nécessitait un long portage, nous avons utilisé pour gagner en encombrement et en légereté un réservoir de polypropylène souple de 200 ml. Deux valves anti-retour sont alors nécessaires pour éviter le reflux dans l'appareil lors de la décompression (voir fig. 1).

Une aiguille de seringue prolongée d'un cathéter ou un trocard dont l'extrémité est en bourrelet (pour ne pas léser les organes) sont suffisants. Je préfère la deuxième solution car

Source MNHN, Paris

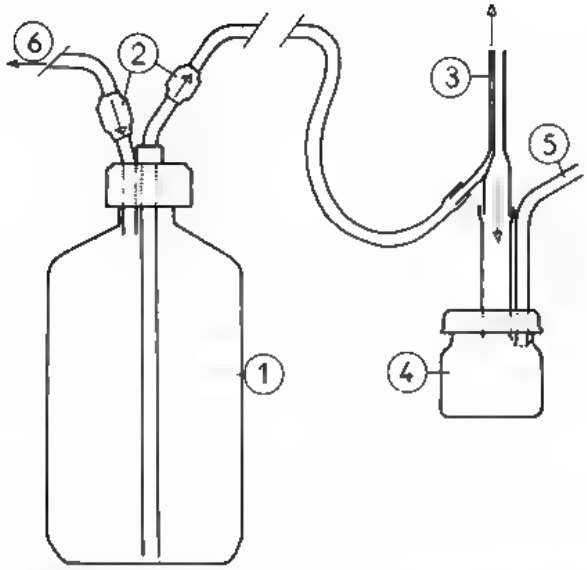


Fig. 1. Schéma d'un dispositif leger de vidange gastrique : (1) réservoir de polypropylène souple de 200 ml ; (2) valves anti-retour ; (3) embout injecteur de laiton à deux conduits : (4) pilulier récepteur ; (5) cheminée d'évacuation avec filtre ; (6) réserve d'eau. D'après CHACORNAC & JOLY (1985).

la rigidité du trocard permet un meilleur contrôle du mouvement et d'éviter de pénétrer le poumon. Ce type d'injecteur est irremplaçable pour les animaux de petite taille (*Triturus helveticus*, *T. italicus*, *T. vulgaris*). La réception du contenu de l'estomac se fait dans une boîte de Petri ou sur un petit tamis (maille 0,5 mm) qui retient les proies. Le contenu est ensuite transvasé dans un pilulier, éventuellement à l'aide d'un pinceau à gouache.

Avec des animaux de plus grande taille, j'ai utilisé un injecteur qui assure en même temps la réception du contenu stomacal dans un pilulier, ce qui diminue les manipulations. Ce système dérive de celui décrit par SEABURG (1957) et utilisé chez les poissons Cottidés (GAUDIN, MARTIN & CAILLÈRE, 1981) et Salmonidés (GEORGES & GAUDIN, 1984). L'eau est injectée par un fin tube de laiton (1 mm), soudé sur un tube plus large, de diamètre adapté à la taille de l'animal. Ce tube, par lequel va transiter le contenu de l'estomac, est relié au pilulier par l'intermédiaire d'une couvercle troué à cet effet. Sur le même couvercle, une cheminée équipée d'un filtre assure l'évacuation de l'air ou de l'eau excédentaire (fig. 2).

Le tableau I donne pour quelques espèces le diamètre de l'embout à utiliser.

UTILISATION

Il est possible de pratiquer la vidange sur l'animal éveillé. Il est néanmoins préférable d'opérer sur l'animal anesthésié. Pour ce faire, les animaux sont immergés dans une solution soit de phénoxyéthanol, dosée à 1 ml pour 2 l d'eau, soit de MS 222, dosée à 1 g par litre (dans ce dernier cas, la solution doit être maintenue à l'abri de la lumière, qui dégrade le produit). L'anesthésie demande plusieurs minutes. Dès leur perte d'équilibre, les animaux doivent être retirés et placés dans un récipient d'eau pure, afin d'éviter toute intoxication par une concentration interne trop élevée.

Source MNHN, Paris

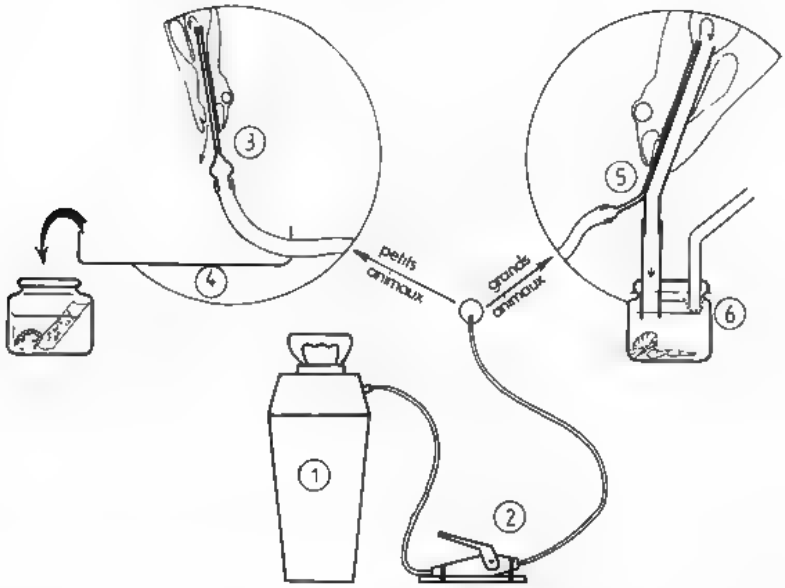


Fig. 2. Schéma du dispositif de vidange gastrique . (1) pulvérisateur horticole , (2) vanne-pédale ; (3) trocard ; (4) boîte de Petri ; (5) embout-injecteur ; (6) piluher récepteur

L'animal est maintenu dans une main dans une position verticale, tête en bas. L'injecteur est introduit dans la cavité buccale en passant sur la langue (la rabattre activement si nécessaire). Dans le cas des embouts pour grands animaux, le passage du pharynx oppose une résistance qui doit demeurer légère, sinon il faut utiliser un embout de diamètre inférieur. Il n'est pas nécessaire d'enfoncer l'embout plus profondément. Par contre dans le cas du trocard, il est préférable d'atteindre l'estomac. Au moment de l'injection, l'animal ne doit pas se gonfler d'eau ; un tel cas signifie que l'injection se fait dans le poumon. Il faut alors stopper et laisser l'animal récupérer (ce qui se passe bien le plus souvent). Dans le cas des gros embouts, une résistance à l'écoulement signifie qu'une proie trop grosse obstrue le tube d'évacuation. Il faut alors retirer l'embout et saisir la proie, qui peut se trouver soit dans le pharynx, soit à l'extrémité de l'embout, avec une pince douce pour entomologie.

Cesser l'injection lorsque l'eau de vidange s'écoule librement sans transporter de proies.

Efficacité et impact

J'ai pu vérifier l'efficacité de la méthode par dissection de l'estomac après vidange chez quelques animaux de laboratoire, *Triturus alpestris*, *T. cristatus* et *Rana esculenta*. Elle est totale si toutes les précautions précédemment décrites ont été prises (extraction de grosses proies avec une pince). Seul est resté collé sur la paroi de l'estomac d'un triton crêté un morceau de feuille morte, sans doute ingéré avec une proie, et dont la forme particulièrement aplatie a pu ne pas donner prise au courant d'eau.

La mortalité est nulle si l'on veille :

– à respecter la limite de débit conseillée : j'ai pu observer une déchirure de l'estomac

Source MNHN, Paris

Tableau I. – Correspondance entre espèce ou taille et diamètre des injecteurs.

Espèce	Diamètre (mm)
T. helveticus, T. vulgaris	trocard
T. alpestris	4
T. cristatus, T. marmoratus	6
Rana sp. 30-40 mm	5,5
Rana sp. 40-50 mm	6
Rana sp. 50-60 mm	7
Rana sp. 60-70 mm	8

chez des tritons avec une pression d'injection trop élevée ; pour un matériel donné, le débit sera une fonction définissable de la pression dans le pulvérisateur, cette dernière contrôlable par un manomètre;

– à appliquer une méthode d'anesthésie rigoureuse. L'anesthésique est toujours un produit toxique qui peut entraîner la mort. Les animaux ne doivent séjourner dans la solution d'anesthésique que le temps nécessaire à leur perte de motricité, et doivent être ensuite placés dans de l'eau pure, éventuellement aérée. L'excrétion de l'anesthésique par la peau est ainsi rendue possible.

Afin d'estimer le stress infligé aux animaux, j'ai, sur le terrain, offert des larves de chironomes à une dizaine de tritons alpestres, après capture et vidange gastrique. Tous ont mangé dans les trois heures qui ont suivi l'operation. Il semble ainsi que les tritons supportent assez bien cette méhode. Je ne dispose cependant pas de données équivalentes pour des amphibiens anoures.

FIXATION DES CONTENUS

Dans le cas d'une étude des biomasses, le meilleur fixateur est le formaldéhyde (formol). Deux ou trois ml ajoutés à l'eau qui baigne le contenu assurent correctement la conservation. L'avantage de ce fixateur est de ne pas altérer sensiblement la composition des proies et donc de permettre la mesure de leur poids, frais ou sec. Son inconvénient est de provoquer des irritations de la muqueuse nasale lorsqu'on doit l'inhaler pendant une longue période ; aussi est-il recommandé de rincer les contenus sur un petit tamis avant d'effectuer les déterminations. L'alcool procure un meilleur confort de travail mais présente l'inconvénient d'être un solvant des graisses et de modifier de façon sensible le poids des animaux. L'alcool est donc un bon fixateur dans le cas d'une étude essentiellement qualitative. L'étiquette doit être rédigée au crayon à papier et glissée dans le pilulier : c'est le plus sûr moyen de limiter les risques de confusion.

DÉTERMINATION DES PROIES

La précision de la détermination dépend du but que l'on se fixe, mais aussi du temps dont on dispose, car le coût en temps augmente de façon exponentielle avec la précision.

Source MNHN, Paris

Mais cette dernière n'apporte pas toujours une information pertinente. Une grande précision implique aussi des tableaux de chiffres trop grands pour être traités aisément par l'informatique. La détermination jusqu'au niveau de l'espèce est intéressante dans le cas par exemple d'espèces proies qui présentent des caractéristiques éco-éthologiques précises (répartition dans le milieu ou trajectoire de déplacement) pouvant fournir au prédateur des éléments de sélection. Dans le cas plus général de la description du spectre alimentaire, les catégories de proies doivent regrouper des espèces dont les caractéristiques stimulantes (taille, mouvement, contraste, situation dans le milieu, odeur) sont proches.

Résumé

Ne pas détruire les populations qu'il étudie est un impératif scientifique ou éthique pour le chercheur en écologie. En procurant le contenu de l'estomac sans porter atteinte à la vie de l'animal, la méthode de vidange gastrique permet chez les amphibiens l'étude du régime alimentaire tout en préservant les populations. Après avoir comparé les méthodes proposées par la littérature, l'article donne une description détaillée de matériels testés dans des études de longue durée du régime d'urodèles et d'anoures. Un tel équipement peut être adapté à des situations particulières comme celle exigeant un long transport à pied. Des conseils sont donnés pour la fixation et la détermination des proies.

Quelques adresses

Pulvérisateur : bons résultats avec un Berthoud Florally 7.

Confection de tamis : tissus nylon de divers vides de maille · Tissmetal, 138 bd de la Croix-Rousse, 69004 Lyon.

Determination des proies : pour la France :

Ouvrages généraux : *Introduction à l'etude des macroinvertébres des eaux douces* ; ouvrage collectif édité par M. Bournaud, H. Tachet & P. Richoux. Disponible auprès de : Association française de Limnologie, 14 avenue de St Mandé, 75012 Paris. *La mésofaune du sol de la region lyonnaise* par J. Mathieu, P. Richoux & H. Tachet, C.R D.P. Lyon, 47 rue Philippe de Lassalle, 69004 Lyon.

Fascicules spécialisés édités par l'Association française de Limnologie : Coléoptères, Annélides, Crustacés, Insectes divers : s'adresser à Prof. R. Ginet / A.F L., Université Claude Bernard Lyon 1, Laboratoire de Biologie animale et Ecologie, 69622 Villeurbanne Cédex.

Pour les autres pays, demander conseil auprès de l'Association de Limnologie du pays concerné.

Références bibliographiques

Castro, M., 1986 – *Activite predatrice du goujon* Gobio gobio. *Aspects eco-éthologiques*. Thèse de troisième cycle, Lyon : 1-197.

Chacornac, J M & Joly, P , 1985 – Activité prédatrice du triton alpestre (*Triturus alpestris*) dans un lac alpin (2125 m, Alpes françaises). *Acta Œcologica, Œcol. Gener.*, **6** : 93-103.

Chovet, M., 1976. – *L'alimentation de la larve de* Cordulegaster boltoni *Donov 1807 (Odonates · Anisoptères) dans son milieu naturel*. Thèse de troisième cycle, Lyon : 1-72.

Source MNHN, Paris

FRASER, D. F., 1976. – Coexistence of salamanders in the genus *Plethodon* : a variation of the Santa Rosalia theme. *Ecology*, **57** : 238-251.

GAUDIN, P., MARTIN, E. & CAILLÈRE, L. 1981. – Le tubage gastrique chez les poissons : mise au point d'un équipement et test de la méthode chez le chabot · *Cottus gobio* L. *Bull. Fr. Pisc* , **282** : 8-15.

GEORGES, J. P. & GAUDIN, P., 1984. – Le tubage gastrique chez les poissons . expérimentation chez la truitelle (*Salmo trutta* L.). *Arch. Hydrobiol.*, **101** : 453-460.

GITTINS, S. P., 1987. – The diet of the common toad (*Bufo bufo*) around a pond in Mid-Wales. *Amphibia-Reptilia*, **8** : 13-17.

GOSS-CUSTARD, J. D., 1977. – Optimal foraging and the size selection of worms by redshank *Tringa totanus*. *Anim. Behav.*, **25** : 10-29.

GRIFFITHS, R.A., 1986. – Feeding niche overlap and food selection in smooth and palmate newts, *Triturus vulgaris* and *T. helveticus*, at a pond in Mid-Wales, *J Anim. Ecol.*, **55** : 201-214.

LEGLER, J. M. & SULLIVAN, L. J., 1979. – The application of stomach-flushing to lizards and anurans. *Herpetologica*, **35** : 107-110.

LIBOIS, R. M., 1984. – Régime alimentaire de l'effraie et écologie des micromammifères *Cahiers Ethol. Appliquée, Enquêtes et dossiers*: 1-202.

OPATNRY, E , 1980 – Food sampling in live amphibians. *Vest. cs. spolec. zool.*, **44** : 268-271.

ROBERTSON, O H , 1945. – A method for securing stomach contents of live fish. *Ecology*, **26** · 95-96.

ROYAMA, T., 1970. – Factors governing the hunting behaviour and selection of food by the great tit (*Parus major* L.). *J. Anim. Ecol.*, **39** : 619-668.

SCHALLER, G. B , 1972. – *The Serengeti lion* Chicago, Univ. Chicago Press : 1-480.

SEABURG, K. G., 1957. – A stomach sampler for live fish. *Prog. Fish Cult* , **19** : 137-139.

Source MNHN, Paris

Alytes, 1987, **6** (1-2): 18-22.

On the *Triturus vulgaris schreiberi* problem : electrophoretic data

Miloš L. KALEZIĆ*, Georg DŽUKIĆ**, Jelka CRNOBRNJA** & Nikola TVRTKOVIĆ***

*Institute of Zoology, Faculty of Science, Studentski trg 16, 11000 Beograd, Yugoslavia
**Institute for Biological Research "Siniša Stanković", 29 Novembra 142, 11060 Beograd, Yugoslavia
***Croatian Museum of Natural History, Demetrova 1, 41000 Zagreb, Yugoslavia

An electrophoretic study for genetic variation of a *Triturus vulgaris* population from Ravni Kotari, an area whose populations were named *T. v. schreiberi*, revealed that in contrast to previously analysed non-nominotypical subspecies, no gene loci showed especial allele frequency patterns. This population is more similar to the nominotypical subspecies, which is congruent with their morphological similarities (SCHMIDTLER & SCHMIDTLER, 1983) and apparently denies a separate taxonomic position for the smooth newt from Ravni Kotari

INTRODUCTION

The smooth newt, *Triturus vulgaris*, underwent considerable evolutionary diversification in the Balkan region. A substantial morphological and genetical differentiation, mainly of populations restricted to small and marginal areas of the species range, occurred during the series of Pleistocene glaciations (BOLKAY, 1928 ; STEWARD, 1969 ; KALEZIĆ, 1984). Not surprisingly, subspecific status has been attached to most of these groups of populations (e.g. FREYTAG, 1954 ; BRAME, 1967 ; THORN, 1969). One of the subspecies, *Triturus vulgaris schreiberi* (WOLTERSTORFF, 1914), was described on a population sample from Bokanjačko Blato, near the town of Zadar (fig. 1). According to the original description, the individuals of this subspecies are characterized by their small size, unspotted belly and by a low and straight dorsal crest. However, SCHMIDTLER & SCHMIDTLER (1983), who studied morphological differentiation of the smooth newt populations inhabiting the Adriatic coast zone, denied the existence of *T. v. schreiberi*. They considered that the populations from Bokanjac (a village nearby Bokanjačko Blato) and the surrounding area (Ravni Kotari) belong to the nominotypical subspecies.

It has been revealed that smooth newt subspecies from Yugoslavia are characterized by different allele frequency patterns at some gene loci (KALEZIĆ, 1984 ; KALEZIĆ & TUCIĆ, 1984). Therefore, in order to yield additional insight into the taxonomic status of the Ravni Kotari smooth newt populations, we made an electrophoretic study for genetic variation of a population from the area in question.

Source MNHN, Paris

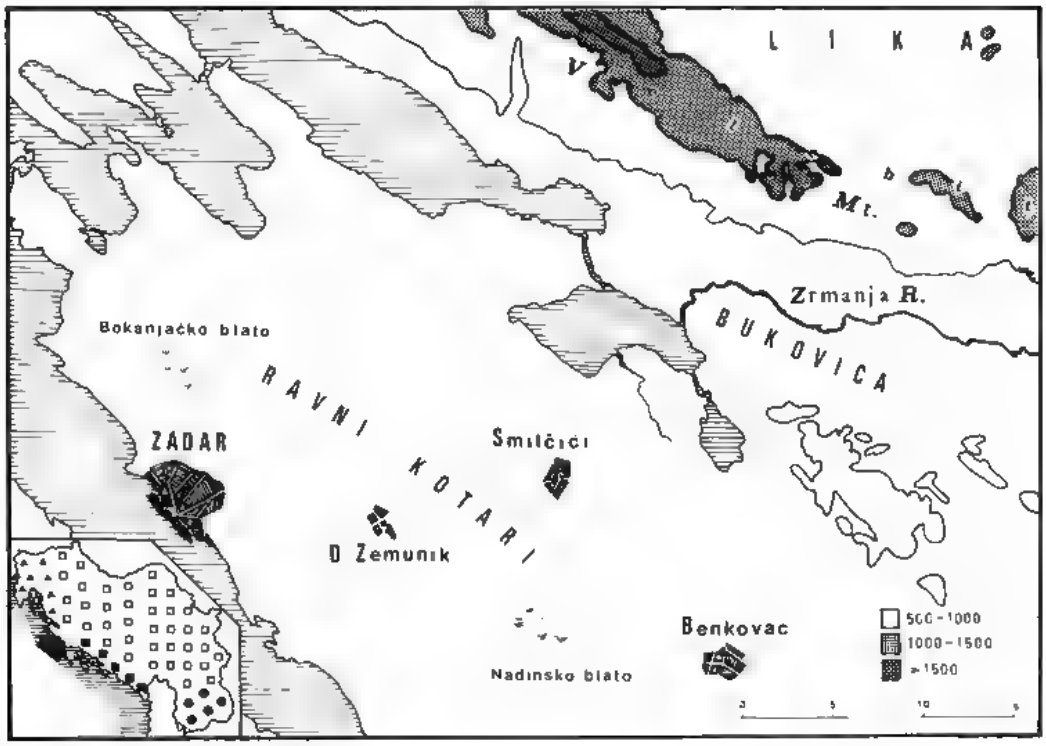


Fig 1. Map showing collection locality (Smilčići) and distribution of *Triturus vulgaris* subspecies in Yugoslavia □ - *T. v. vulgaris*, ▲ - *T v. meridionalis*, ■ - *T. v dalmaticus*, ● - *T. v. graecus*.

MATERIAL AND METHOD

The sample used for electrophoretic analysis was obtained from a population in the vicinity of the village of Smilčići, 20 km northeast of Zadar (fig. 1). Adult newts, 37 in number, were collected from a few holes dug nearby which are used as water supply sites for agricultural purposes. Interestingly, 23 individuals were paedomorphic (mainly females) and this again conformed to the statement that the Submediterranean area is an important centre of the smooth newt paedomorphosis (KALEZIĆ & DŽUKIĆ, 1986).

The electrophoretic techniques used to study protein polymorphism are thoroughly described elsewhere (HEDGECOCK, 1976). Twenty-one presumptive gene loci were scored (see Table I in KALEZIĆ, 1983). Genetic interpretation of allozymic data are based on criteria elaborated for *Triturus* newts by KALEZIĆ & HEDGECOCK (1980) and KALEZIĆ & TUCIĆ (1984). Estimates of genetic identity are expressed in term of NEI'S (1972) *I* value.

RESULTS

The following gene loci were monomorphic in the smooth newt population analysed : *Acph-2*, *Est-1*, *Fum*, *Gdh*, *G-6Pdh*, *Idh*, *Ldh*, *Pgi*, *6-Pgdh*, *Pgm*, *Prot-1*, *Prot-2*, *Prot-3*, and

Source MNHN, Paris

Table I. - Allele frequencies at four loci in the Smilčići sample, and weighted means of allele frequencies at the same loci of four *Triturus vulgaris* subspecies (from KALEZIĆ, 1984).

Locus	Alleles	Smilčići	*T.v. vulgaris*	*T.v. meridionalis*	*T.v. dalmaticus*	*T.v. graecus*
Acph-2	95	0.000	0.075	0.044	0.753	0.000
	100	1.000	0.889	0.144	0.000	0.073
	105	0.000	0 036	0.812	0.247	0.927
Est-4	96	0.435	0.137	0.134	0.000	0.000
	100	0.565	0.863	0.866	0.000	1.000
	110	0.000	0.000	0.000	1.000	0.000
Mdh-2	93	0.056	0.186	0.044	1.000	0.870
	100	0.944	0.637	0.889	0.000	0.130
	107	0.000	0.177	0.067	0.000	0.000
Me	98	0.042	0.015	0.015	0.242	0.149
	99	0.250	0.307	0.116	0.459	0.461
	100	0.653	0.486	0.756	0.299	0.373
	102	0.056	0.192	0.113	0.000	0.017

Sod (for abbreviations see Table I in KALEZIĆ, 1983). Polymorphic loci which were the most variable included *Est-4* with an observed heterozygosity of 0.484, *Me* (0.444) and *α-Gpdh* (0.300). The population from Smilčići has a mean heterozygosity per individual of 0.062±0.002, with averaged number of alleles detected per locus being 1.47±0.04. Metamorphic individuals appeared to have slightly more genetic variation than paedomorphic ones ; heterozygosity per individual was 0.068 and 0.059, respectively. Genetically these two subsamples ("paedomorphic" and "metamorphic") are very similar ; NEI's *I* value is 0.992.

In order to compare the overall genetic identity between the population in question and populations of smooth newt subspecies which have been electrophoretically analysed so far, we calculated the *I* values. NEI's measure was computed using weighted means of allele frequencies of *T. v. vulgaris, T. v meridionalis, T. v. dalmaticus* and *T. v. graecus* (presented in Table I in KALEZIĆ, 1984). The population from Smilčići is genetically more similar to the nominotypical subspecies (I=0.987), than to *T. v. meridionalis* (I=0.977), *T. v. graecus* (I=0.907) and *T. v. dalmaticus* (I=0.865). For the same purpose, Table I shows allele frequencies of four gene loci for the Smilčići population as well as for the above-mentioned subspecies. These loci appeared to differentiate smooth newt subspecies which inhabit the Yugoslav part of the species range.

DISCUSSION

In contrast to previously analysed *T. vulgaris* subspecies, none of the twenty-one assayed gene loci of the population from Smilčići showed special allele frequency patterns. The

Source MNHN, Paris

absence of a relatively specific genetic entity apparently cannot candidate the smooth newt population from Ravni Kotari as belonging to a different taxon. Allele frequencies of *T. v. vulgaris* populations are the most similar to those of the population we studied, which is congruent with their morphological similarities as suggested by SCHMIDTLER & SCHMIDTLER (1983).

A rather broad zone of gene flow between *T. v. vulgaris* and *T. v. meridionalis*, presumably secondary, was found (see fig. 3 in KALEZIĆ, 1984). Populations from the zone had *Acph-2*^{100} and *Acph-2*^{105} alleles in appreciable frequencies, while allele *Acph-2*^{100} was by far the most common in *T. v. vulgaris* and allele *Acph-2*^{105} was so in *T. v. meridionalis* (Table 1). In the population from Smilčići the *Acph-2*^{100} allele is fixed and this indicates that smooth newt populations from Ravni Kotari have no contact with nearby populations of *T. v. meridionalis* from Lika (see fig. 1). It was found that these groups of populations are separated by a zone which for unknown reason(s) contains only the Alpine newt (*Triturus alpestris*). Such a zone continues and also separates the Ravni Kotari populations from the nominotypical subspecies. In spite of isolation, the genetic structure of smooth newt populations from Ravni Kotari has not changed much from the main body of *T. v. vulgaris* populations. The relatively high level of genetic variability of the population in question might indicate a nonfragmented population structure of smooth newts from Ravni Kotari, and also that these populations have not suffered population size bottlenecks as has been suggested for some other populations of the Submediterranean zone (KALEZIĆ, 1984).

The population from Smilčići is substantially different from more southern subspecies, especially *T. v. dalmaticus* which comprises adjacent smooth newt populations (fig. 1). Electrophoretically, *T. v. dalmaticus* is well differentiated from the Smilčići population due to different alleles at loci *Acph-2* and *Est-4*, as well as substantial differences in allele frequencies at loci *Me* and *Mdh-2*.

RÉSUMÉ

Une étude électrophorétique de 23 locus présumés de 37 individus d'une population de *Triturus vulgaris* de Ravni Kotari, région dont les populations ont reçu le nom de *T. v. schreiberi*, a montré que dans ce cas, contrairement aux autres sous-espèces non-nominatives étudiées jusqu'à présent, aucun locus ne manifeste de fréquence allélique particulière. Cette population est plus semblable à la sous-espèce nominative, ce qui est congruent avec les données morphologiques (SCHMIDTLER & SCHMIDTLER, 1983), et ce qui indique que les Tritons vulgaires de Ravni Kotari ne méritent apparemment pas une position taxinomique séparée.

(Résumé traduit par A. DUBOIS)

LITERATURE CITED

BOLKAY, S. J., 1928. – Die Schädel der Salamandrien mit besonderer Rucksicht auf ihre systematische Bedeutung. *Zeitsch. Anat. Entw.*, Munchen, Berlin, **86** : 259-319.

BRAME, A. H., 1967. – A list of the world's recent and fossil salamanders. *Herpeton*, **2** : 1-26.

Source : MNHN, Paris

FREYTAG, G. E., 1954. – *Der Teichmolch* Wittenberg, Lutherstadt, A. Ziemsen Verlag.
HEDGECOCK, D , 1976. – Genetic variation in two widespead species of salamanders, *Taricha granulosa* and *Taricha torosa. Biochem. Genet.*, **14** : 561-576.
KALEZIĆ, M. L., 1983. – Geographical aspects of genetic variability in the smooth newt (*Triturus vulgaris*). *Genetika*, **15** : 93-103.
KALEZIĆ, M. L , 1984 – Evolutionary divergences in the smooth newt, *Triturus vulgaris* (Urodela, Salamandridae) : electrophoretic evidence. *Amphibia-Reptilia*, **5** : 221-230.
KALEZIĆ, M. L. & DŽUKIĆ, G., 1986. – The frequent occurrence of paedomorphosis in the smooth newt (*Triturus vulgaris*) populations from the Submediterranean area of Yugoslavia. *Amphibia-Reptilia*, **7** : 86-89.
KALEZIĆ, M. L. & HEDGECOCK, D., 1980. – Genetic variation and differentiation of three common European newts (*Triturus*) in Yugoslavia. *Brit. J. Herpetol.*, **6** : 49-57.
KALEZIĆ, M L. & TUCIĆ, N , 1984. – Genic diversity and population genetic structure of *Triturus vulgaris* (Urodela, Salamandridae). *Evolution*, **3** : 389-401.
NEI, M., 1972. – Genetic distance between populations. *Amer. Natur.*, **106** : 283-292.
SCHMIDTLER, J. J. & SCHMIDTLER, J. F., 1983. – Verbreitung, Ökologie und innerartliche Gliederung von *Triturus vulgaris* in den adriatischen Küstengebieten. *Spixiana*, **1** : 229-249.
STEWARD, J. W., 1969. – *The Tailed Amphibians of Europe.* Newton Abbot, David & Charles.
THORN, R., 1969. – *Les Salamandres d'Europe, d'Asie et d'Afrique du Nord.* Paris, Lechevalier
WOLTERSTORFF, W., 1914. – Zwei neue Tritonenformen der paläarktischen Region. *Abh. Ber. Mus. Naturk. Vorgesch* , Magdeburg, **2** (4) : 371-381.

Source MNHN, Paris

Alytes, 1987, **6** (1-2): 23-26.

On the identity of the so-called "algae like cells" in tadpole cultures of European green frogs (*Rana ridibunda*)

Manuel POLLS PELAZ

Laboratoire des Reptiles et Amphibiens,
Muséum national d'Histoire naturelle,
25 rue Cuvier, 75005 Paris, France

Green algae of the genus *Chlorella*, corresponding morphologically to the so-called "algae like cells" of previous authors, were found in laboratory water conditioned with tadpoles of European Green Frogs. The colour of these cells seems to depend on the light conditions under which the tadpoles are raised. These algae were found in varied culture conditions, including those where the tadpoles show rapid and synchronized development , this suggests that these algae do not play a significant inhibitory role in the development of tadpoles.

INTRODUCTION

In the course of studying the micro-organisms associated with the alimentary tract of tadpoles of European Green Frogs (*Rana ridibunda* of hybrid origin), I found the same cellular types that had been described and photographed by RICHARDS (1958, 1962), AKIN (1966), LICHT (1967), and HEUSSER & BLANKENHORN (1973), cultured from other tadpoles of various American and European anurans. Some of these authors attributed an inhibitory role to these cells during the growth of larvae. This paper is devoted to their identification, with a comment on this proposed inhibitory role.

MATERIAL AND METHODS

The larvae studied came from a clutch deposited the night of 5 June 1985 in the laboratory by a pair of diploid *Rana* kl. *esculenta* specimens, which had been found in amplexus the same day in a pond in the Fontainebleau forest near Paris These tadpoles were *Rana ridibunda* of hybrid origin (GRAF & POLLS, in prep.). They were reared in the Paris Museum from June to September 1985 at various densities (5-30 tadpoles/liter), volumes of water (0,5-1,5 liter), and exposed to varied intensities and sources (natural and artificial) of light. The culture water was tap water which had remained standing for 24-28 hours for dechlorination ; it was replaced in part (1/3 of each volume) every 1-2 days. The tadpoles were fed "ad libitum" with a progressive diet of boiled lettuce salad, Tetramin, and cooked egg

Source MNHN, Paris

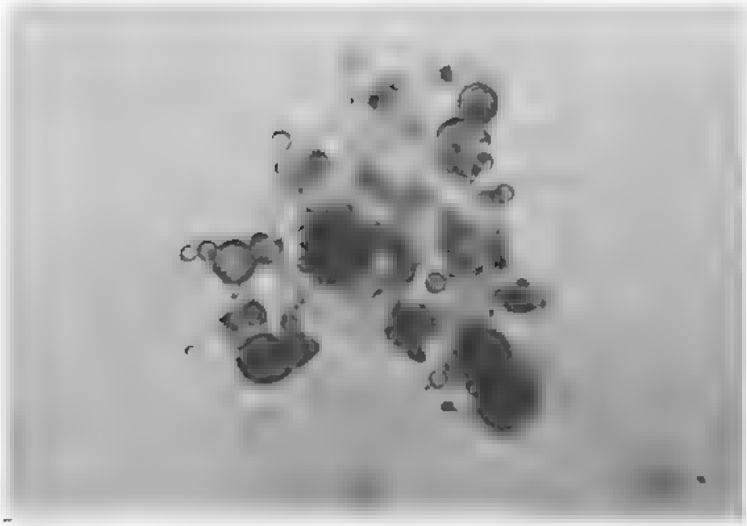


Fig. 1 *Chlorella* green algae cells found in tadpoles' cultures, corresponding to the so-called "algae like cells" of previous authors.

yolk. Microscopic observations, measurements and photographs were made at magnification of 400. Initial observations were made just after sampling, with samples isolated in sterilized 20 cm^3 flasks, under natural North-oriented sun-light. Later observations were made on the same samples, from a week to several months after isolation. Taxonomic identification of the algae cells was confirmed by Dr. BOURRELY.

RESULTS

The same cell types that had previously been described in the American and European literature (see above) were found in all water samples – with, or without, any inhibition on growth of the tadpoles. The colour of these cells was variable ; cells from the samples with natural light were green, while those from the samples with weak artificial light were uncoloured. Independent of colour, all these cells had the morphological characteristics of green algae belonging to the genus *Chlorella*. The cells often formed aggregations (fig. 1). The characteristics were the same as described by BOURRELY (1966) for all of probably more than 30 species in the genus :

- Spherical or elliptic cells.
- Cells containing a plast and a pyrenoid.
- Diameter from few to maximal 20 micrometers.

After one week of incubation of the uncoloured forms under strong sun-light and in isolation from external contamination, major blossom of green *Chlorella* cells was observed, with an almost total disappearance of the non-coloured forms. The same bottles, put in total darkness, retained green algae for several months.

Source MNHN, Paris

DISCUSSION

RICHARDS (1962) tentatively identified the same types of algae, which she found uncoloured, as belonging to the genus *Prototheca*. The morphology of the two genera is very similar, and they only differ with respect to colour – green (*Chlorella*), versus unpigmented (*Prototheca*) ; however, some mutations are known in the genus *Chlorella* which affect the number of pigment molecules (MARGALEF, 1983). The possibility exists that there are two algal genera in my samples, but this would not alter any conclusions about the possible inhibitory role of these cells in tadpoles growth. It should be noted that, in the same culture water where I found *Chlorella*, several species of algae (e.g. *Selenastrum, Euglena, Phacus, Cosmarium, Scenedesmus, Phacotus*), protozoa and bacteria (e.g. *Zooglea, Moraxella, Aeromonas, Kurthia, Micrococcus*) were also found (KAISER & POLLS, in prep.).

AKIN (1966) suggested that the "algae like cells" could execute an inhibitory role on tadpoles as carriers of a molecule present in the intestine of anuran larvae Following the opinions of WEST (1960) and STEINWASCHER (1978) – who discusses earlier accounts by ROSE & ROSE (1961), STEPANOVA (1974) and RUNKOVA, STEPANOVA & KOVAL'CHUK – , I consider that, except possibly at extremely high concentrations, *Chlorella* plays a negligible role in the initiation of growth inhibition.

ACKNOWLEDGEMENTS

I thank Dr. P. BOURRELY and Dr. R. POURRIOT for their help in algae identifications, and Dr. A. DUBOIS and Dr. R. WASSERSUG for their interesting comments on the manuscript. The original French manuscript was kindly translated into English by Dr. A. DUBOIS

RÉSUMÉ

Au cours d'un élevage de têtards de la Grenouille verte européenne, des algues vertes appartenant au genre *Chlorella* ont pu être détectées ; leur morphologie était identique à celle décrite par d'autres auteurs dans d'autres cultures de têtards, pour d'autres espèces d'Anoures dans d'autres localités ; à cause de leur caractéristique incolore, ces algues avaient été appellées des "algae like cells". Dans nos élevages la présence des cellules vertes (*Chlorella*) ou des non colorées paraît dépendre des conditions d'éclairage. Des *Chlorella* et des cellules non colorées ont été retrouvées dans différents cristallisoirs d'élevage des têtards, y compris ceux où on a observé un développement bon et rapide, synchronisé pour le groupe.

De ce point de vue, le rôle inhibiteur de la croissance des têtards, attribué par d'autres auteurs à ces algues, ne semble pas devoir seulement dépendre de la présence qualitative des "algae like cells" ou des *Chlorella*.

Source MNHN, Paris

LITERATURE CITED

AKIN, G C., 1966. – Self-inhibition of growth in *Rana pipiens* tadpoles. *Physiol Zool.*, **39** : 341-356

BOURRELY, P., 1966. – *Les Algues d'eau douce I Algues vertes* Paris, Boubée & Cie · 1-511.

HEUSSER, H. & BLANKENHORN, H., 1973. – Crowding-Experiments mit Kaulquappen aus homo- und heterotypischen Kreuzungen der Phanotypen *esculenta*, *lessonae*, und *ridibunda* (*Rana esculenta* - Komplex, Anura. Amphibia) *Revue suisse Zool.*, **80** : 543-569.

LICHT, L E., 1967. – Growth inhibition in crowded tadpoles : intra specific and inter specific effects. *Ecology*, **48** : 736-745.

MARGALEF, R., 1983. – *La Limnologia.* Barcelona, Omega : i-xiv + 1-1010.

RICHARDS, C M , 1958 – The inhibition of growth in crowded *Rana pipiens* tadpoles *Physiol. Zool.*, **31** : 138-151.

----- 1962. – The control of tadpole growth by alga-like cells. *Physiol. Zool.*, **35** : 285-296.

ROSE, S. M. & ROSE, F. C., 1961. – Growth controlling exudates of tadpoles. *Symposia of the Society for Experimental Biology*, **15** : 207-218.

RUNKOVA, G. G., STEPANOVA, Z. L. & KOVAL'CHUK, L. A , 1974. – Organ specificity in the action of metabolites of amphibian larvae on their endogenous metabolism under condition of increased population density The role of protein in the regulating influence of metabolites *Akademia Nauk SSSR Doklady Biological Sciences Section*, **217** · 328-330. Not seen ; cited fide STEINWASCHER (1978).

STEINWASCHER, K., 1978. – Interference and exploitations competition among tadpoles of *Rana utricularia*. *Ecology*, **59** : 1039-1046

STEPANOVA, Z. L., 1974. – The chemical nature of the products of metabolism of amphibian larvae, excreted into the water. *Soviet Journal of Ecology*, 5 . 148-149. Not seen ; cited fide STEINWASCHER (1978).

WEST, L. B., 1960. – The nature of growth inhibitory material from crowded *Rana pipiens* tadpoles *Phsyiol. Zool.*, **33** : 232-239.

Source MNHN, Paris

Alytes, 1987, **6** (1-2) : 27-55.

Again on the nomenclature of frogs

Alain DUBOIS

Laboratoire des Reptiles et Amphibiens,
Muséum national d'Histoire naturelle,
25 rue Cuvier, 75005 Paris, France

CONTENTS

Abstract
Introduction
Suggested rules for the nomenclature of class-group taxa
Distinction between different types of generic names and spellings
Introduction
Different types of generic names and spellings
New genus versus new replacement name
Unjustified emendation versus incorrect subsequent spelling
Unjustified emendation versus new replacement name
WAGLER's generic replacement names
Other problems raised by SAVAGE (1986) in generic names
Valid family-group names
Classification used
Conclusion
Resume
Literature cited

The author answers the various criticisms recently expressed by SAVAGE (1986) on his own works, and shows that these are due to severe misunderstandings of several important rules of nomenclature. A particular attention is given to the problems raised by the distinction of different types of names and spellings (new name, new replacement name, unjustified emendation, incorrect subsequent spelling), and several examples are treated in detail. Some of the suggestions of SAVAGE (1986) concerning family-group names are shown to amount to a proposal of a return to pre-*Code* rules for these names, since this author does not accept the principle of priority for them. The question of the rules suggested by DUBOIS (1984) for the nomenclature of class-group taxa is also discussed, and the modifications recently proposed in this respect by LESCURE, RENOUS & GASC (1986) are criticized

Note — This paper pas judged too long by the editors of *Copeia* to whom it had first been sent. In order to save space, the various papers by DUBOIS cited below will be referred to using code numbers, which are made explicit in the bibliography. The abbreviation *ASW* refers to FROST's (1985) checklist.

Acknowledgements. — I wish to thank Annemarie OHLER for her help in the preparation of this paper and Ronald I. CROMBIE, Richard WASSERSUG and particularly Carl GANS and Jean-Jacques MORÈRE for reading the original manuscript and for their comments about it.

Source : MNHN, Paris

INTRODUCTION

The journal *Copeia* recently published a review by SAVAGE (1986) of a paper of mine on the suprageneric nomenclature of anuran amphibians (D-26). It so happens that this author, who is a member of the ICZN, disagrees with me on several important nomenclatural points, but that I am not at all convinced by his arguments. I am answering these comments in detail below. As will be shown, some of the points in question are not unrelated to some of the comments I made elsewhere (D-41) concerning *ASW*.

SAVAGE's (1986) comments bear on different aspects of my work, which will be discussed successively below : suggested rules for the nomenclature of class-group taxa ; distinction between different types of generic names or spellings ; valid family-group names ; classification used. As will be shown, SAVAGE's (1986) disagreement with my work comes from two major sources : disagreements on the interpretation of the *International Code of zoological Nomenclature* (ANONYMOUS, 1985 a) ; and misunderstanding of some parts of my (French) text.

An initial comment. SAVAGE (1986 : 259) writes : "Unfortunately Dubois would have been better served had he waited for the appearance of the revision (3rd ed.) of the International Code of Zoological Nomenclature (1985) to appear (sic) instead of basing many of his conclusions on the 2nd ed. (published in 1964 and amended in 1974)." This is a rather strange statement indeed. The "short work" (as SAVAGE, 1986 : 259, calls it) in question was the result of a 4 years study. It was finished and sent to printer in 1983, and published in 1984. On the other hand, the 3rd. edition of the *Code* had been announced for several years already, and there was no assurance that it would appear in 1985 rather than in 1986 or even later. SAVAGE (1986) is not serious when he says that everything should have stopped in the world, or at least that no nomenclatural work should have been published "just before" the publication of this 3rd. edition. The question in fact must be reversed. This 3rd. edition introduces significant changes in some articles of the *Code*, and indeed I immediately corrected my own work just after the new *Code* had appeared, in a paper (D-29) that SAVAGE (1986) ignored, although it was published in August 1985. But, as was pointed out in this paper, the changes introduced in these articles of the *Code* are largely open to criticism, since they generate an unavoidable new cause of confusion and instability (see also below). It would have been the responsibility of the authors of this new edition to avoid introducing such new causes of disruption of nomenclatural stability, and not of systematists to stop working until the new edition appears. Now, this new edition, which was clearly prepared too quickly, is undoubtedly open to strong criticism (see e.g. DUPUIS, 1984 ; DUBOIS, D-29), and will certainly have to be modified in some of its parts in the future. To follow SAVAGE's suggestion, should all systematists stop to work on nomenclatural matters, in the expectation of the forthcoming 4th. edition of the *Code*? Let us hope they will not, although it is clear that a "final" *Code* will never exist.

SUGGESTED RULES FOR THE NOMENCLATURE OF CLASS-GROUP TAXA

SAVAGE (1986) provided a shortened translation of some of the rules I proposed (D-26) for the nomenclature of class-group taxa (i.e. all taxa above the family-group). This trans-

Source MNHN, Paris

lation is correct, although abridged, for most rules. Two errors of translation must however be pointed out. In rule No. 4, the last part of SAVAGE's sentence ("and were not created for taxa superior in rank to those of the class-group") is completely invented : since I proposed to consider *all* names above the family-group as belonging to the class-group, there exist no taxa superior in rank to those of the class-group ; even the names of highest ranks, such as those of phyla and kingdoms, do belong, in my opinion, to the class-group, for the reasons explained below. This last part of the sentence should be replaced by the following : "even when they were not the first ones to have been created for the higher taxa in question." In rule No. 6, the first part of SAVAGE's sentence ("In the absence of an international consensus *among* several old names that have had considerable usage it *is* preferable to choose.. ", italics mine) is incorrectly translated and should be replaced by : "In the absence of any international consensus *and* of old names having been used for a long period, it *may be* preferable to choose.. ". As will be acknowledged by those who will look carefully at these sentences, the errors of translation sensibly modified my proposals, making them more open to criticism. Besides these errors of translation, it should be added that my proposals were not limited to these six rules. I also proposed to generalize the use of the type concept to the names of the class-group, and suggested that the types of class-group taxa should be *genera*, not families or other taxa. These type genera would be designated either by (original or subsequent) monotypy, or by subsequent designation among the originally (or subsequently) included genera of the taxon.

Recently, LESCURE, RENOUS & GASC (1986) suggested to modify my proposals, in two respects : (1) they proposed to recognize not only one class-group above the family-group, but a class-group and an order-group; (2) they suggested that types of class-group taxa should be families, and types of order-group taxa should be classes. I disagree with these proposals, for the following reasons.

To separate higher taxa (above the family-group) in two different groups would be extremely artificial, because many names first created e.g. for an order were later applied to a class, or the reverse. If two distinct sets of names were to be recognized, that means that the principles of priority and of homonymy would apply independently in these two groups. Thus, when e g a name created for a taxon considered a super-order by its author is transferred to the category subclass by a subsequent author, it would then have to be treated as a new name, with its own author and date. This would complicate very much and most unnecessarily the matters. Furthermore and above all, if class-group and order-group names were separated, the principle of homonymy could not apply between them · this would allow the possibility that the same name be beared e.g. by a class and by an order (either included in the class, or in another class, possibly in a quite different group). This would be a strong source of confusion, and should be avoided. The principle of homonymy is an important principle of the *Code*, which should not be underestimated. Due to the very high number of species-group names, it cannot apply in an absolute way at this level, where it only applies within a given genus. But at higher levels, it applies within the whole animal kingdom : no two animal genera or families can have the same name, no matter how far these taxa may be in the phylogeny and classification. I think the same should apply to all animal taxa above the family-group. This is all the more justified that the number of taxa at this level of classification is extremely low as compared to the numbers of taxa at lower levels and there would be no point in distinguishing two independent sets among this low number of names. Fi-

Source MNHN, Paris

nally, if a distinct group of names was to be recognized for orders and related taxa, the same should be true for phyla, kingdoms and other higher taxa.

In reality, there exists at present no theoretical reason for stating that a higher taxon is, say, a super-order or a subclass. These categories are only successive steps in a hierarchical scale, and if new dichotomies are added, new taxa recognized, or, on the reverse, if taxa are merged, the place of many taxa in the scale may well move up or down. It is true that the same also occurs for taxa of the family-group and of the genus-group, but nevertheless, at least at the genus level, some rules may be proposed to reduce the part of arbitrariness in the allocation of taxa to given categories (see DUBOIS, D-12, D-14, D-30). There seems therefore to exist neither practical nor theoretical justification for recognizing two distinct groups of names above the family-group. These principles had guided me in my proposal of a single class-group for all these names, and I had to explain them here in full detail only because this proposal was challenged.

It was also after reflection, and not by chance, that I suggested that nominal class-group taxa should have types, and that these types should be nominal genera, not families, or orders, etc. As a matter of fact, a hierarchical succession of types would only unnecessarily complicate the nomenclature of higher taxa and would create additional difficulties at any change of diagnosis of the higher taxa and at any transfer of included lower taxa from one group to another. In the family-group, all taxa names are based on generic names, whatever their rank : a familial name is not based on a subfamilial name, a subfamilial name on a tribal name, etc. Thus all taxa of the class-group should, for more simplicity and clarity, be based on names of the same category. Then, why not choose the family, rather than the genus, for this category? For two reasons: (1) since family-group names cannot be, like class-group names, entirely new names, but are based on generic names (and formed in a very strict manner on the basis of the stem of these names), to designate a type family is strictly equivalent to designating a type genus (on the name of which the family name is based) and brings no additional information ; (2) many old class-group names were created at the beginning of systematics, when the category family still did not exist or was not in common use (it began so only quite after the beginning of the XIX century). Therefore, these taxa were created without included families, while they were in most cases credited with included genera at their foundation, the category genus being in use since LINNAEUS. Now, the proposal of LESCURE, RENOUS & GASC (1986) would make more difficult, in many cases, the determination of the type taxon of a given class-group taxon. In all the cases where the taxon was created with no included family, the "originally included families" would be the first ones to have been referred to this taxon by subsequent authors, and this information may be difficult to trace. Another possibility would be to consider that the originally included families are those based on the generic names cited as included in the new taxon at its creation, but : (1) this would be strictly equivalent to recognizing type genera (rather than type families) for these taxa ; (2) the originally included genus (or genera) may not be the type genus (genera) of (an) existing family-group name(s), which would cause an additional problem. For all these reasons, I think it justified to maintain my initial proposals and to refuse the changes proposed by LESCURE, RENOUS & GASC (1986).

To come back now to SAVAGE's (1986) comments, he seems to accept my proposals, but he adds rightfully that to have universal value these rules should be adopted by the ICZN after discussion : this is true, but before they could be discussed these rules had to be pro-

Source MNHN, Paris

posed by someone. SAVAGE (1986) does not seem to reject my rule No. 3 ("A class-group name that is a junior homonym of another class-group name must be rejected") Then, why does he state that the names Archaeobatrachia Reig, 1958 and Neobatrachia Reig, 1958 are "perfectly good names", when I had shown (D-19, D-26) that these names are junior homonyms (despite the one-letter difference) of SARASIN & SARASIN's (1890) Archaeobatrachi and Neobatrachi? Also, he states that my rule No. 6 creates difficulties, and he seems to suggest that a strict priority rule should be followed. However this proposal is contradictory to my rule No. 4. To take only the example of anurans, if a rule of priority was to be followed, neither the names of NOBLE (1931) nor those of STARRETT (1973) would be the valid ones for the suborders of this order. Numerous much older names do exist (see KUHN's 1967 list, which furthermore is incomplete), and strict application of the rule of priority to this case would require the resurrection of names which have never or almost never been used and which are almost completely forgotten now. This is the reason why I had expressly stated (D-26 : 9) that, at the class-group level, the principle of priority should not be strictly applied.

Finally, it is the full right of SAVAGE (1986 : 261) to "like subordinal names such as Archaeobatrachia or Lemmanura better than Discoglossoidei", but let us note that class-group names such as Discoglossoidei have not only been proposed by SOKOL (1977) in Anura, but also by LESCURE, RENOUS & GASC (1986) in Gymnophiona, and are currently universally accepted as valid by all authors in Urodela (see e.g. *ASW*), so that, at least for amphibians, names of this kind have tended to gain a growing acceptance among systematists.

DISTINCTION BETWEEN DIFFERENT TYPES OF GENERIC NAMES OR SPELLINGS

INTRODUCTION

As unpleasant as it may be to some modern taxinomists, systematics is not a young discipline, and it has undergone many changes since its beginnings. These changes have been particularly drastic in that part of systematics which deals with the names of taxa, i.e. nomenclature. The beginning of "modern" nomenclature is arbitrarily fixed in 1758, at the publication of LINNAEUS' 10th. edition of the *Systema Naturae*, but it is clear that at this time almost no rules existed. The need for nomenclatural rules appeared and developed only with the increase of the number of known taxa and of their zoological names, and led to the creation of international Rules of zoological Nomenclature, which have been the matter of various modifications and of several editions, the last of which appeared very recently (ANONYMOUS, 1985 a ; see pp. xv-xvi of this book for a very brief history of the current *Code*). It is clear that works published prior to the establishment of any set of rules could not follow them. For example, no principle or priority was followed by many authors in the XVIII and XIX centuries, and even quite late in the XX century some authors did not follow it in all cases : e.g. in amphibians BOULENGER as late as in 1920 still rejected some names (e.g. *Polypedates afghana*) for "inappropriateness", although he clearly acknowledged that they were senior synonyms of names considered by him as valid.

The same applies to all the other rules of the current *Code* (principle of homonymy, rules for the designation of types, rules for the formation and treatment of names, rules for

Source MNHN, Paris

the authorship of names, etc.). This is important to bear in mind when in 1986 we use the 1985 edition of the *Code* to analyse old, pre-*Code* texts. I have already stressed on several occasions (DUBOIS, D-21, D-42 ; BOUR & DUBOIS, 1984) the fact that the application of the *Code* to such texts "must be made with care, understanding and intelligence" (BOUR & DUBOIS, 1984 : 357). For example, the concept (and term) of lectotype was created only at the beginning of our century (SCHUCHERT & BUCKMAN, 1905) and became widely used only in the second half of this period ; it is therefore irrelevant to reject a lectotype designation which was made in the older times by the simple use of the term "type" (see e.g. BISCHOFF, 1982 and DUBOIS, D-42).

Similarly, to decide if a new name was proposed as the name of a new taxon, or as a new replacement name (nomen novum) for a taxon already recognized by previous authors requires a detailed and careful analysis when old texts are involved. Here we come to the main criticism of SAVAGE (1986) concerning my work. SAVAGE (1986 : 260) writes : "[Dubois] apparently believes that the citation of a previously proposed name in the synonymy or footnotes associated with the proposal of another name by a subsequent author makes the latter name a new replacement name." This statement is totally unfounded, since I never wrote or even believed such things. My judgments concerning the status of old names never rely on "general rules" like the strange rule invented by SAVAGE, but on a careful analysis of the texts themselves, as is shown in my previous works on similar problems (D-8, D-11, D-17, D-18, D-21, D-24, D-26, D-29, D-40). In this respect, I disagree with SAVAGE (1986) and also with HOLTHUIS (1983) on the status of the generic name *Dendrobates* and of several other generic names created by WAGLER (1830 b). To save space in the *Bull. zool. Nom.*, and because I thought all interested biologists could go by themselves back to the original texts, study them honestly, and come to the same conclusion as myself, I wrote : "Instead of discussing this in detail in this *Bulletin*, I think it simpler to refer the readers to WAGLER's (1830) original text itself. Other arguments could also be found by studying the other publications of WAGLER." (D-21 : 198). However, SAVAGE's (1986) paper shows that I had been too optimistic. Since despite my previous papers on this question (D-18, D-21), some people remain unconvinced by my arguments, it is necessary to come back to the question in more detail, as heavy and space consuming as it may seem.

Before going into the details of WAGLER's works, however, it will be useful to discuss these matters at a more general level.

DIFFERENT TYPES OF GENERIC NAMES AND SPELLINGS

When a systematist uses a generic name in a scientific publication, he may use an existing name, without changing it or with some modifications, or a new name. For the sake of clarity, the different possible cases may be presented in the form of a dichotomic key.

I. The writer uses a new generic name for a genus which he considers new (even if including already named species): both the *taxon* and the *name* are new, and must be credited to the author of the publication. In modern times, the new name is generally presented with the indication "gen. nov." or "n. gen." In older texts, indications like "mihi" or "nobis" were sometimes used, but in many other cases the fact that the name and taxon are created as new in the paper must be inferred from other direct or indirect sources of evidence.

Source MNHN, Paris

II. The writer deals with a genus which he credits to a previous author (even if he modifies in part the diagnosis or the contents of this genus, e.g. in retiring from it or adding into it some species). This reference to an already existing taxon is generally explicit, but in some cases must be inferred from the context : for example, in older papers many batrachologists used the names *Rana*, *Bufo* or *Hyla* without ever mentioning their authors, but it was however clear that they were not creating new names or taxa. In this case the *taxon* is not new (although it may be somewhat emended). As for the *name*, two possibilities appear.

A. The writer uses exactly the same name (same spelling) as the author who had first recognized the taxon and named it. This situation is clear: neither the *taxon* nor the *name* are new.

B. The writer uses a spelling slightly or totally different from that of the original name. Two possibilities again appear here.

1. The new spelling differs slightly (e.g. generally by one letter or a few letters) from the original spelling, and this difference in spelling is not intentional from the part of the writer : it may be due to a misspelling of his part (e.g. a mistake in copying the original text) or of the part of the printer (misprint). Such a spelling is an "incorrect subsequent spelling" and it has no status in nomenclature. In this case like in the preceding one, neither the *taxon* nor the *name* are new.

2. The writer uses intentionally a different name or spelling because he thinks, for some reason, that the original name created by the first author is incorrect or invalid and must be modified or replaced. In this case it is clear that the *taxon* is not new but that the *name* is. In modern times, this new name is called a new replacement name or nomen novum (ANONYMOUS, 1985 a), and it is generally presented with the indication "nom. nov.". In older times, it was sometimes presented as a new name in an explicit sentence, but in many other cases the fact that it was such a name must be inferred from other direct or indirect sources of evidence. This latter category may again be subdivided into two categories, although as will be discussed in detail below, no objective or reliable criteria currently exist to distinguish between them in all cases.

a. The new name is a *new replacement name* for the original name, i.e. a completely new name, not derived from the original one.

b. The new name is an *emendation* of the original spelling of the name, i.e. only the spelling of the name is changed but the new spelling is clearly derived from the original one. The current *Code* here distinguishes again two subcategories : *justified* emendations (which have no separate status in nomenclature) and *unjustified* emendations (which have a separate status in nomenclature).

Since in all the older texts (XVIII and most of XIX century texts) the above distinctions were often not clearly expressed in all words, we need some criteria to decide what kind of name was used by a given author. In this respect it will be useful to study separately several types of distinctions which may prove difficult in some cases : new genus name versus replacement name ; unjustified emendation versus incorrect subsequent spelling ; unjustified emendation versus new replacement name.

Source MNHN, Paris

NEW GENUS NAME VERSUS NEW REPLACEMENT NAME

SAVAGE (1986 : 259) states that according to the *Code* a name may be considered as a new replacement name only when it is "a new name *expressly* proposed as a replacement for an available name" (italics his). This is only partially correct. As a matter of fact, the words "proposed expressly" appear in the *Code* only in Art. 13(a)(iii), which deals with *names published after 1930*, but in Art. 12(b)(3), which concerns *names published before 1931*, the *Code* only states that "the proposal of a new replacement name (nomen novum) for an available name" is enough to make this name available. In the Glossary of the *Code* (p. 258), a "new replacement name", is defined as "A name established expressly to replace an already established name", which is more restrictive that the wording of Art. 12. In fact, one could discuss at length about the sense which should be given to the word "expressly" in these sentences, but this would make little sense. I have always believed that, to solve a problem, it is more useful to take time to think about it than to repeat or underline words. Now, when dealing with old taxinomic words, how will it be possible to distinguish between a new generic name and a new replacement name for an existing genus?

The writers of many older texts did not indicate the authors of the generic names they were using For some well-known names (like *Rana, Bufo* or *Hyla*), this causes no problem, but the same is not true for less common names. Furthermore, a very special, but real, problem arises from the fact that LINNAEUS (1758, 1761, 1766, 1767) had a very wide concept of the genus, so that his genera were later subdivided. In many cases, the subsequent authors named the new genera with terms which LINNAEUS had proposed for species. For example, among the species placed by LINNAEUS (1758) in his genus *Rana* were *R. pipa*, *R. bufo* and *R. hyla*. LAURENTI (1768) used the same terms for his genera *Pipa, Bufo* and *Hyla*. In some cases however, this may raise some problems. For example, LINNAEUS's (1761) species *Rana bombina* served as the basis for OKEN's (1816) genus *Bombina*. MERREM's (1820) genus name *Bombinator* was obviously based on the same root. Is this latter name a new generic name or a new replacement name (or an emendation) for *Bombina*? This can be established only through a careful examination of the original publication. Fortunately, MERREM (1820) gave long and detailed synonymies in his book, and, not only did he not cite the generic name *Bombina* as a synonym of *Bombinator*, but, even more, he did not cite OKEN at all ; he presumably did not know OKEN's (1816) *Lehrbuch der Naturgeschichte* For this reason, I considered *Bombinator* Merrem, 1820 as a new generic name, not as a replacement name (or an unjustified emendation) for *Bombina* Oken, 1816 (D-26 : 13-14 ; D-29). This example shows that a careful analysis of the original texts is often required to ascertain the status of a name.

As a general rule, assurance that a new name is not the name of a new taxon but a new name for an existing taxon requires some evidence, in the original text, that this was the intention of the author This evidence may be of various types, as will be shown by some examples studied in more detail below. The existence of such evidence answers to the qualification "proposed expressly" which appears in the *Code*.

Source MNHN, Paris

UNJUSTIFIED EMENDATION VERSUS INCORRECT SUBSEQUENT SPELLING

Here again, SAVAGE (1986) cites and italicizes the phrase "demonstrably intentional" without discussing its meaning in detail. However, the *Code* itself gives in its Art. 33(b)(i) additional information in this respect : "A change in the original spelling of a name may only be interpreted as "demonstrably intentional" when in the work itself, or in an author's (or publisher's) corrigenda, the original and the changed spelling are cited and the latter is adopted in place of the former, *or when two or more names in the same work are treated in a similar way*" (italics mine). Although this statement broadens already very much the concept of "demonstrably intentional" as compared to SAVAGE (1986), who seems to believe that this phrase may only mean "stated in full words", and is enough to show that this author is wrong in considering names like *Bombitator* or *Calamites* as incorrect subsequent spellings or new generic names (see below), it is in my opinion still too restrictive and should be modified in future editions of the *Code*. As a matter of fact, the phrase "demonstrably intentional" cannot be restricted to the two possibilities mentioned in this sentence (either citation of both the original and the changed spelling, or a "similar" treatment of several names). These words mean : (1) that the new spelling was proposed in the clear *intention* to replace the original spelling of the name ; (2) that this intention was made clear by the writer in some way, not necessarily the only two ones mentioned above. One of these ways may be that the new spelling contains *by itself* this information. For example, when in older days a name was found to have been incorrectly formed with respect to its etymology (badly latinized, etc.), it often happened that a subsequent author changed the spelling in order to make it correct. Since in these remote times all biologists were cultured people, who knew Latin and Greek names or could easily trace them, it was often felt unnecessary to "expressly" write in all words that the name had been emended, because this was considered obvious.

In such cases, the evidence that the *intention* of the author was to replace a (supposedly) incorrect spelling by another one may be found in the new spelling itself, when it was correctly formed from the Latin or Greek root *whereas the original spelling was not*, or could be considered so. As we shall see in detail below, such a case clearly applies to the names *Megalophrys* versus *Megophrys*, *Bombitator* versus *Bombinator*, *Myiobatrachus* versus *Myobatrachus*, etc. If this is believed by some to be contrary to the wording of the *Code*, then this simply means that this wording is wrong, and should be corrected. If the ICZN decided that *Megalophrys*, *Bombitator* and *Myiobatrachus* are *not* unjustified emendations (but incorrect subsequent spellings having no status in nomenclature), because their authors did not write in full words that they were so, then I frankly declare it would be a stupid decision, because there can be no doubt in such cases about the *intention* of the authors of such spellings to correct the original names according to the Latin or Greek grammar.

This does not mean at all, as SAVAGE (1986) seems to believe, that I am ready to accept any subsequent spelling as an emendation Some evidence that the *intention* to change the spelling must exist in the original texts, and in this respect it is useful to give an indicative, *non limiting*, list of such potential evidence. To be deemed an emendation, a name must meet at least either of the following conditions .

(C1) the name is presented in words as such,

(C2) both the original and the modified spellings are given, and the second one is retained by the writer as the valid one;

Source MNHN, Paris

(C3) several names are treated in a similar way, e.g. corrected according to the etymology, or according to some, possibly arbitrary, rule which is evident from the context;

(C4) the modified spelling is clearly etymologically justified and correctly formed, while the original spelling was not, or could be considered not to be (see below for additional comments);

(C5) the modified spelling is introduced by the very author of the original spelling, either in a "corrigenda", as stated by the *Code* (which however does not precise if the latter must have been published in the same time as the original name, e.g. as an addenda to it, or may have appeared later), or in later publications, especially when the new spelling is used repeatedly in subsequent works and the original spelling definitively abandoned by the author;

(C6) the modified spelling is introduced by a subsequent author and used repeatedly in the same or, better, in subsequent works, whereas the original spelling is definitively abandoned by this author (especially when before introducing the new spelling he had made use of the original spelling in previous publications).

A few examples of these criteria shall be given and discussed below in the comment of some of SAVAGE's (1986) statements ; examples of the other ones may be given here.

Thus, the type (C3) of evidence may be illustrated by PALACKÝ's (1898) paper in which this author used a lot of emended spellings, according to a strange rule of his own, which is clearly evident in the text itself, although it is never stated in words : he systematically replaced the letters "ph", when they appeared *within* a generic name, by the letter "f" ; on the other hand, he did not modify the generic names which were *beginning* by "Ph". Strange and unjustified as this "rule" may be, PALACKÝ's (1898) action was clearly intentional and all these modified spellings are unjustified emendations, which have a separate status in nomenclature. Since only a few of these names have already been mentioned in recent works (DUBOIS, D-11, D-17, D-26 ; CLARKE, 1983), I am giving here in Table I a list of PALACKÝ's (1898) emendations of generic names, along with the original spellings of these names. Besides these, PALACKÝ (1898) also proposed a few emendation of specific names (*Rana cyanoflyctis*, p. 378 ; *Hyla stefeni*, p. 379 ; *Bufo filipinicus*, p. 380 ; *Bufo dialofus*, p. 381).

An example of the type (C6) of criteria may be provided by the name *Ptychadaena* Parker, 1930. PARKER (1930 a) introduced the new spelling *Ptychadaena* without any explanation ; this spelling appeared twice in this paper, but the spelling *Ptychadena* Boulenger, 1917 was not mentioned. In his subsequent publications (e.g. 1930 b, 1932, 1936 a, 1936 b, 1937), PARKER always used the spelling *Ptychadaena*, but he never apparently mentioned the spelling *Ptychadena*, which he could not ignore, since he was well acquainted with BOULENGER's works. Despite the absence of any "explicit" statement in words in this respect, it is clear that PARKER (1930 a) intentionally modified the spelling *Ptychadena*, and that *Ptychadaena* must be considered an unjustified emendation, with its own status in nomenclature.

Now that we have discussed the major types of evidence for the fact that a new spelling was intentionally created by an author, it may be useful to see which are the principal clues to the reverse situation, i.e. to "incorrect subsequent spellings":

(C7) no explanation is given for the modified spelling, and the latter has no clear etymological justification (on the contrary, it may often be incorrectly formed while the original spelling was correctly formed);

Source MNHN, Paris

Table I. – Unjustified emendations of generic names of amphibians created by PALACKÝ (1898).

Unjustified emendation	Page in PALACKÝ (1898)	Original generic name	Recent reference to PALACKÝ's (1898) name
Amfignathodon	375	*Amphignathodon* Boulenger, 1882	
Asterofrys	380	*Asterophrys* Tschudi, 1838	
Calofrynus	374	*Calophrynus* Boulenger, 1882, an unjustified emendation of *Kalophrynus* Tschudi, 1838	
Chlorofilus	374	*Chlorophilus* Baird, 1854	
Cofofryne	379	*Cophophryne* Boulenger, 1887	
Eupemfix	376	*Eupemphix* Steindachner, 1863	
Genyofryne	375	*Genyophryne* Boulenger, 1890	
Glyfoglossus	379	*Glyphoglossus* Günther, 1868	
Megalofrys	379	*Megalophrys* Wagler, 1830, an unjustified emendation of *Megophrys* Kuhl & Van Hasselt, 1822 a	D-17
Nannofrys	375	*Nannophrys* Günther, 1869	D-11
Nectofryne	374	*Nectophryne* Buchholz & Peters *in* PETERS, 1875	
Pseudofryne	374	*Pseudophryne* Fitzinger, 1843	
Rhacoforus	374	*Rhacophorus* Kuhl & Van Hasselt, 1822 a	D-11
Rhombofryne	378	*Rhombophryne* Boettger, 1880	
Scafiopus	381	*Scaphiopus* Holbrook, 1836	
Scafiorhina	378	*Scaphiophryne* Boulenger, 1882	
Stenofryne	380	*Sphenophryne* Peters & Doria, 1878	

(C8) the original spelling is not mentioned, or, if it is, this is in a different part of the text, as a valid name, and no choice is made between both spellings;

(C9) the modified spelling appears only once in the text, and is never used again by the same author in subsequent publications, while this author may revert to the use of the original spelling in these papers;

(C10) the author of this modified spelling is known for having made numerous such mistakes (because of his carelessness regarding these matters, of his bad handwriting, which was difficultly read by the printer, of the carelessness of the printer, etc.).

A few examples here also may illustrate these general criteria.

Thus, besides the unjustified emendations mentioned above, PALACKÝ (1898) also introduced modified spellings which are certainly incorrect subsequent spellings according to type (C8) of evidence above, since he used in the same paper two, or even three, different spellings, including the original one, and dit not choose between them : *Caluela*, p. 375, *Calluella* and *Calluela*, p. 380 ; *Megalixalus*, p. 375, and *Megalixcelus*, p. 378 ; *Batrachylodes*, p. 375, and *Batrachhylodes*, p. 381. In a few other cases, he used generic or specific names which differ from the original names by no clear rule of transformation, which appear only once in the text, and which are therefore, according to criteria (C7), (C8) and (C9), best considered as incorrect subsequent spellings, without status in nomenclature (although their modification was possibly intentional in some cases): *Phrynomantes*, p 376 ; *Grypinus* and

Source MNHN, Paris

Leiuporus, p. 382 ; *Rana mascarenensis*, p. 377 ; *Ixalus kakhynensis*, p. 379 ; *Cofofryne sikkimenus*, p. 379.

As I have already had the occasion to stress it (D-17), J.E. GRAY may be considered as a top specialist in the field of incorrect subsequent spellings : he often used different spellings for the same name in a given work, modified without any reason names previously proposed by other authors or even by himself, etc. For this reason, of the type (C10) of evidence, I suggested that the name *Megalophys*, which appears in GRAY (1842) and is considered by SHERBORN (1928) as an unjustified emendation of *Megalophrys* Wagler, 1830, is in fact an incorrect subsequent spelling, without status in nomenclature. In the same paper (D-17), I showed that the spelling *Megaphrys*, credited by SHERBORN (1928) to GRAY (1825), was also an incorrect subsequent speling. These examples show that, contrary to what SAVAGE (1986) seems to believe, I have never considered all subsequent spellings as emendations, but based my opinion on a careful analysis of the texts themselves.

UNJUSTIFIED EMENDATION VERSUS NEW REPLACEMENT NAME

This problem is not tackled by SAVAGE (1986), but, for the sake of completeness, it will be briefly discussed here. A more complete discussion of this question may be found in a previous paper (D-29) ignored by this author.

The need for a distinction between these two types of names is a new one, which was created by the modifications introduced in Art. 32, 35 and 39 of the new edition of the *Code*. Before, both types of names had the same status, or rather, an unjustified emendation was only considered as a particular case within the general category of "new replacement name" (see e.g. D-11, D-17, D-18, D-26). As a matter of fact, as is shown in terms of logic in the dichotomic key presented above, these two types of names are very closely related, being only subdivisions of the category II(B)(2) above : in both cases, a subsequent author replaces an existing name, which he deems to be incorrect or invalid for some reason, by a new replacement name. Of relatively minor importance in this case is the fact that this new replacement name may be "completely new", or obtained by a modification of the spelling of the original name. Furthermore, not only is this distinction of little relevance, but it is also, in many concrete cases, difficult to make, as is shown in more detail elsewhere (D-29).

The definition given by the *Code* (Art. 33) of an emendation ("any demonstrably intentional change in the original spelling of a name") does not give us any criterion to allow deciding in a clear, objective and indisputable manner, when one is confronted with a new spelling which "resembles" that of an already existing name, if it is an "intentional change in the original spelling" of the name, or a completely new name, based e.g. on a related but different etymology. When one thinks to this problem in some detail, one realizes that several criteria could be proposed for recognizing emendations (e.g.: given number of letters of difference with the original spelling ; changes in the radical or in the termination of the name ; recourse to a more exact etymology ; maintenance of the pronunciation of the name ; etc.), but that none of them is objective and general enough to account for all cases of emendations. The following examples, discussed in detail by DUBOIS (D-29), illustrate this complex problem : *Megophrys montana* Kuhl & Van Hasselt, 1822 and *Megophrys monticola* Smith, 1931 ; *Kaloula* Gray, 1831 and *Callula* Gunther, 1864 ; *Kassina* Girard, 1853 and *Cassina*

Source MNHN, Paris

Cope, 1864 ; *Occidozyga* Kuhl & Van Hasselt, 1822 and *Oxydozyga* Tschudi, 1838 ; *Bufo* Laurenti, 1768 and *Batrachus* Rafinesque-Schmaltz, 1814 ; *Rana* Linnaeus, 1758 and *Ranaria* Rafinesque-Schmaltz, 1814 ; *Hyla* Laurenti, 1768 and *Hylaria* Rafinesque-Schmaltz, 1814 ; *Triton* Laurenti, 1768 and *Triturus* Rafinesque, 1815 ; *Caecilia* Linnaeus, 1758 and *Cecilia* [Rafinesque-Schmaltz, 1814].

But, if the *Code* gives no precise clue for distinguishing emendation from nomen novum in these cases, why should this distinction be important? It only became important with the following new parts of Art. 32, 35 and 39 of the 1985 *Code*, which did not exist in the previous editions :

Art. 32(c)(iii): "An original spelling is an 'incorrect original spelling' if (...) in the case of a family-group name, it (...) is based (...) on an unjustified emendation of a generic name (...)".

Art. 35(d)(ii): "A family-group name based upon an unjustified emendation of a generic name is an unjustified original spelling and must be corrected (...)".

Art 39(a): "*Effect of unjustified emendations*. - If an unjustified emendation of the name of the type genus becomes itself the replacement name, the family-group name is then to be based upon it by correcting the name to the spelling required by the stem of the name of the replacement type genus ; the author and date of the family-group name remain unchanged."

At first reading, these new rules may appear trifling. In fact, as I have shown (D-29, D-41), in amphibians these modifications entail a change of spelling, author and date for one family-group name (Cycloramphini ; sole case noticed by SAVAGE, 1986, although on the basis of a wrong analysis, since he considers *Cyclorhamphus* as an incorrect subsequent spelling ; see below), and a change of author and date for 12 other family-group names (Hylidae, Hylinae, Hyloidea, Megophryinae, Microhylidae, Microhylinae, Pipidae, Pipinae, Pipoidea, Ranidae, Raninae, Ranoidea ; none of these changes is remarked by SAVAGE, 1986). Similar changes have been necessary in the higher nomenclature of chelonians (BOUR & DUBOIS, 1986) and will be necessary in all other groups. As justly stressed by LAURENT (1986 b), it is surprising that it was the ICZN, the function of which is to provide rules for allowing the greatest universality and stability possible in nomenclature, which introduced in 1985 these new rules which seriously threaten the stability of family-group names. Furthermore, these new rules are also liable to cause additional confusions and raise new problems even more difficult to solve, and for which rather artificial solutions must be found, if stability is to be preserved : see in this respect the difficulties raised by the new Art. 39(a) of the *Code* in the case of the family-group name Triturinae (D-29).

In conclusion, I repeat here my previously expressed opinion (D-29) that the new changes brought in Art. 32, 35 and 39 of the *Code* are not good and should be suppressed. I contend that unjustified emendations should still be considered as only particular cases of replacement names, and not be treated differently, even when they are the basis of family-group names. Furthermore, the particular treatment of these names suggested by the *Code* in such cases is contradictory with the fact that unjustified emendations continue to be considered by Art. 33(b)(iii) of the new *Code* as names having their own status in nomenclature and available with their own authors and dates.

On the other hand, if these modifications were to be maintained, then the ICZN *must* devise and publish precise criteria and rules to allow taxinomists to objectively decide if a given name is to be considered as an unjustified emendation or as a new replacement name. I predict that this would not be an easy task.

Source MNHN, Paris

WAGLER'S GENERIC REPLACEMENT NAMES

Now that we have seen the things rather generally, let us look more carefully at the problems raised by some of the generic names used by WAGLER (1830 b). SAVAGE (1986), following HOLTHUIS (1983), is mainly concerned with the problem of the name *Dendrobates*, because in my first paper on this question (D-18) I had presented an interpretation at variance with that accepted in all the previous applications published in the *Bull. zool. Nom.* on this case, one of which was even co-signed by SAVAGE (SILVERSTONE, 1971 ; MYERS & DALY, 1971 ; CUELLAR et al., 1972 ; PETERS et al., 1972 ; LESCURE, 1982). For some reason, maybe because both are members of the ICZN, HOLTHUIS (1983) and SAVAGE (1986) want to preserve this first interpretation, but unfortunately they are wrong. Because of the relative importance of this case as an examplar one (since it has now been discussed by several authors and that no agreement seems to be currently reached among the supporters of opposed opinions), this question is dealt with here in some detail.

In WAGLER's times, the phrases "new replacement name" or "nomen novum", with the precise meaning they now have in the *Code*, did not exist. If the word "expressly" is taken literally (i.e. if these phrases must appear as such in the text), it is clear that no name published at the time of WAGLER, or even later, will ever qualify as a "nomen novum". But if it is taken, as suggested above, in the sense that the author must clearly show, somehow or other, that his intention is to propose a new name for an already existing taxon, and not for a new taxon, it will be clear that many names of this period qualify as such.

As I had already pointed out (D-18), the names proposed by WAGLER (1830 b) to replace already existing names are all presented in a similar way, with a footnote giving (1) the etymology of the new name, (2) the replaced name, with its author and sometimes its date and reference, and (3) sometimes, additional comments. What is important in my argumentation (D-18) is that I stressed this similarity of presentation and considered that all pairs of names which appear in this way in WAGLER's text (e.g., in Amphibia, *Asterodactylus* for *Pipa*, *Dendrobates* for *Hylaplesia*, *Enydrobius* for *Hylodes*, *Systoma* for *Engystoma*, *Bombitator* for *Bombinator*) are to be treated similarly as a couplet composed of a replacement name and of a replaced name. Strangely however, neither HOLTHUIS (1983) nor SAVAGE (1986) discuss this aspect of my argument. Both of them refuse to consider *Dendrobates* as a replacement name for *Hylaplesia*, and SAVAGE (1986) further refuses to consider *Asterodactylus* and *Bombitator* as replacement names for respectively *Pipa* and *Bombinator*. None of them however discusses the cases of *Systoma* or of *Enydrobius* (for which MYERS, 1962, and LYNCH, 1971, had already adopted the same interpretation as me).

SAVAGE's (1986) insistance on the fact that *Asterodactylus* is not a replacement name for *Pipa* is all the more incomprehensible to me that I had already stressed (D-21) that this name had first been proposed by WAGLER, not in his 1830 book, but in a 1827 paper, where he wrote : "(*Asterodactylus m. Pipa* Auctor)". To refuse to interpret such a presentation as a statement that the first of both these names is "proposed expressly as a new replacement name" for the second one makes really no sense, since this mode of presentation for new replacement names was very common in these times. To take examples dealing with amphibians, a similar presentation appears in the works of RAFINESQUE-[SCHMALTZ] (1814, 1815) and of GISTEL (1848) (see below). If SAVAGE refuses to consider *Asterodactylus* as a replacement name of *Pipa*, he should logically also refuse to consider e.g. *Triturus* Rafinesque, 1815

Source MNHN, Paris

as a replacement name for *Triton* Laurenti, 1768, or *Philautus* Gistel, 1848 as a replacement name for *Orchestes* Tschudi, 1838 (see below). Since in these cases no diagnoses were given for the supposedly new taxa, and no included species mentioned, *Triturus* and *Philautus* should be considered as nomina nuda, without status in nomenclature. As a result, the valid name for the genus currently known as *Triturus* Rafinesque, 1815 should become *Molge* Merrem, 1820, and that for the genus currently known as *Philautus* Gistel, 1848 should become *Dendrobatorana* Ahl, 1927 (since, as will be shown elsewhere [MORÈRE & DUBOIS, in preparation], the holotype of *Hylambates dorsalis* Peters, 1875, type species of *Dendrobatorana*, belongs in fact to the genus *Philautus*). Numerous similar examples could easily be found. SAVAGE (1986) is not embarrassed with these problems, since he does not at all consider the consequences of his refusal to recognize that *Asterodactylus* was clearly proposed as a replacement name for *Pipa*.

One may wonder why WAGLER felt necessary to replace some existing generic names by others, coined by him. Let us note in passing that even if we had no clue to help us to understand why he did so, that would not in the least allow us to reject the evidence, and in this respect the discussion given by SAVAGE (1986) about the name *Cacopus* is completely irrelevant . no matter if GÜNTHER (1864) was wrong in believing the name *Uperodon* to be preoccupied, the fact is that he clearly and "expressly" presented *Cacopus* as a replacement name for the latter! However and fortunately in this case, WAGLER himself gave us the explanation. To be sure, to find this it is necessary to read Latin and German in WAGLER's text, but I am of the opinion that it is not possible to deal correctly with nomenclatural problems when one is unable to read, or at least decipher, Greek, Latin, German and French![1]

WAGLER (1830 b : 17) gives us a first indication in a footnote concerning the mammalian generic name *Tapirus*, for which he proposes the new replacement name *Rhinochoerus*. He then quotes LINNAEUS, as follows : "Nomina generica, quae ex graeca vel latina lingua radicem non habent, rejicienda sunt *Linné* Philos. bot. stud. *Spreng.* p. 265." (Generic names, which do not have Latin or Greek roots, must be rejected). It is thus clear that he rejected as invalid all *generic* (not specific) names for which he did not find a root in Latin or Greek languages. Careful examination of the whole book of WAGLER bears this interpretation out : in all those cases in which an existing generic name was neither Latin, nor Greek,

1 One of the readers of the manuscript of this paper crossed this paragraph out, writting "Horrors!" in the margin and adding, "My God, you even demand that people read French! It may therefore be interesting to point out here that, if English is certainly, *at the moment*, the most "international" of all languages, French is the second one in this respect According to MALHERBE (1983), the ten most "international" languages rank as follows (1) English, official or "privileged" language in 47 countries, (2) French, 26 countries, (3) Arab, 21 countries, (4) Spanish, 19 countries, (5) Portugese, 7 countries, (6) German and Swahili, 5 countries, (8) Dutch, 4 countries, (9) mandarin Chinese and Italian, 3 countries. The six official languages of the United Nations are English, French, Spanish, Russian, Arab and mandarin Chinese If the number of persons in the world who speak a given language as their mother tongue is considered, English, with 320 millions, is only second, after mandarin Chinese (700 millions) and before Hindi Urdu (280 millions), Spanish (190 millions) and Russian (160 millions)

In fact, in one disagrees with my demand that zoologists should be able to "read, or at least decipher" French, this simply means that only one language in the world, English, is considered worthy of being known by them! I would not support such a statement, especially when one deals with disciplines, like systematics and nomenclature, in which old texts of the XIX century and even before are still in current use in these times the leadership of English in science was not established, and many important works were written in French, German, Latin and other languages Nowadays, if 67% of the scientific publications in the world are in English, 8% are in French, which cannot be considered trivial In recent years, other languages, especially Spanish, have had a growing use in some fields, like zoology, and there is no reason to believe that this movement will stop Ignorance of all the non English scientific literature cannot be profitable to any scientist in the world, since ignorance has never been useful to anyone

Source MNHN, Paris

nor based on Latin or Greek roots, WAGLER proposed a new replacement name. In some cases, he even expressed his perplexity as to the possible etymology of a generic name, which for this reason he replaced by a nomen novum. Thus, the name *Systoma* is proposed to replace *Engystoma*, which is presented as follows in a footnote on p. 205: "Gen. *Engystoma* (quid?) *Fitzing.*".

After WAGLER's death in 1832, MICHAHELLES (1833) reproduced in *Isis von Oken* an unpublished manuscript of WAGLER, which had been written before the 1830 book of this author. In this text we can find additional explanations of the reasons why WAGLER rejected some generic names as invalid. In a footnote (*in* MICHAHELLES, 1833 : 888), WAGLER states that he found no evidence of the use of the names *Hyla* and *Calamita* in classical Latin texts, and that for this reason these names must be rejected. He states that he found the name *Calamites* in PLINIUS, as the name of the common European treefrog. He adds that unfortunately FITZINGER had already given the name *Calamita*, "(das in *Calamites* umgeandert werden muß)" (which must be changed into *Calamites*) to another genus of frogs, and that, in order not to upset FITZINGER's work, he refrains from using the name *Calamites* for the European treefrog. In consequence he proposes the new remplacement name *Discodactylus* for *Hyla*, the latter not being of classical Latin or Greek origin. This footnote clearly shows : (1) that, as a general rule, WAGLER did propose new replacement names for generic names considered by him invalid, because they were not of strictly classical Greek or Latin origin (i.e. a name used as such in classical Latin or Greek, or a name based on classical Latin or Greek roots) ; (2) that nevertheless WAGLER made clearly the distinction between new names for already known taxa, and for new taxa, and that he respected the works of previous authors (his refusal to use the name *Calamites* for a different genus than that called *Calamita* by FITZINGER – after SCHNEIDER, 1799 – is a rare example, for this epoch, of respect of the works of others) ; (3) more specifically, that SAVAGE's (1986) analysis of the status of the names *Calamites* and *Dendrobates* is in error.

This leads us now to discuss the case of the unjustified emendations of generic names proposed by WAGLER (1830 b), such as *Bombitator*, *Megalophrys* or *Calamites*. The name *Calamites* is expressly presented by WAGLER (in MICHAHELLES, 1833) as a replacement name for *Calamita*, and could either be considered as a nomen novum or as an unjustified emendation of this latter name (see discussion above). Strangely, SAVAGE (1986) considers it as the name of a new genus, overlooking the fact that WAGLER (1830 b : 200) expressly wrote : "CALAMITES (...) *Fitzing.*", thus clearly acknowledging FITZINGER as the author of the taxon, even though he emended his name. In reality, in SAVAGE's logic, if *Calamites* is not accepted as a replacement name or an unjustified emendation for *Calamita*, it should not be considered as the name of a new genus (since it is credited to a previous author), but as an incorrect subsequent spelling, without status in nomenclature. It is true that the spelling *Calamita* does not appear in WAGLER's (1830 b) book, but it appears in the manuscript of WAGLER, anterior to this 1830 book, which was later published by MICHAHELLES (1833). I contend that this case is a typical example of type (C3) of evidence for emendations presented above, which is also acknowledged in Art. 33(b)(i) of the new *Code*.

SAVAGE's (1986) too rapid way of working has another, quite funny indeed, consequence. SAVAGE (1986) states that *Calamites* is not an unjustified emendation of *Calamita*, but the name of a new taxon. He adds that FITZINGER's (1843) designation of *Hyla cyanea* as type species of *Calamites*, rediscovered by DUBOIS (D-26 : 19), is valid, but he does not

Source MNHN, Paris

discuss the consequences of this fact : these would be that *Calamites* Wagler, 1830 would be a senior synonym of the well-known and much used generic name *Litoria* Tschudi, 1838! Fortunately, *Calamites* Wagler, 1830 is preoccupied by *Calamites* Guettard, 1770 (see D-26 . 14), so that, even if SAVAGE (1986) was right, no nomenclatural disruption would result. However, these facts and their consequences should all be considered and discussed when such question are tackled : this clearly shows that in nomenclature a very slight divergence of opinion as to the status of a name may have considerable consequences in the long run.

As for the name *Bombitator*, SAVAGE (1986) is still less excusable to consider it as the name of a new genus, because WAGLER (1830 b) mentions the name "*Bombinator Merr.*" in a footnote on p. 206 and in the index on p. 346. In Latin, the name "*bombitator*" (bee) only did exist, while the names "*bombina*" and "*bombinator*" did not exist but were coined by XVIII and XIX century authors on the basis of the name "*bombus*" (buzzing). That *Bombitator* cannot either be considered as a fortuitous incorrect subsequent spelling is also shown by the fact that this name alone (and not *Bombinator*) appears on several occasions in WAGLER's book (pp. 132, 206, 294, 296, 301, 302, 303, 305, 306, 346). It is thus clear that the spelling *Bombitator* was purposedly used by WAGLER instead of the spelling *Bombinator*, but for the same taxon as MERREM (1820). If this is not an unjustified emendation, I wonder which name of this epoch will qualify for this category.

To come back finally to the name *Dendrobates* now, it was clearly presented by WAGLER (1830 b) as a replacement name for *Hylaplesia* because the latter name was not acceptable according to WAGLER's conceptions, being based on the root "*Hyla*" which was rejected by WAGLER (1830 b ; *in* MICHAHELLES, 1833) as invalid since it did not exist in classical Latin. The fact that WAGLER (1830 b) only recognized some of the species originally included in *Hysaplesia* (and *Hylaplesia*) by BOIE (*in* SCHLEGEL, 1826, 1827) is of no relevance here, because, as remembered above in the dichotomic key under the heading II, an author may perfectly, while accepting a taxon created by a previous author and crediting it to him, modify in part the diagnosis or content of the taxon : by doing so he does not create a new taxon, because otherwise any new modification of the diagnosis or content of a taxon would result in the creation of a new taxon and of a new name, and no stability of taxinomy and nomenclature would ever be possible.

As for the status of the name *Hylaplesia* itself, it is certainly open to discussion. It might be possible to consider it very formally as an incorrect subsequent spelling. However, as I have shown (D-18, D-21), this name has an etymological justification (being based on *Hyla*), while *Hysaplesia* has none and is clearly the result of a misprint for *Hylaplesia*. Since the spelling *Hylaplesia* has been used by various authors since its creation, while the spelling *Hysaplesia* has remained ignored until the paper by STEJNEGER (1937) where it was resurrected, this name, on which is based the family-group name Hylaplesidae, is better considered as having an independent status in nomenclature (for more detailed discussions of other similar cases, see D-17). It is therefore justified to consider *Hysaplesia* Boie *in* SCHLEGEL, 1826, which was in reality clearly a misprint in the original publication, as the "correct original spelling" of the name in the sense of the *Code*, and *Hylaplesia* Boie *in* SCHLEGEL, 1827 as an unjustified emendation of the latter. Finally, *Dendrobates* Wagler, 1830 is without possible doubt a new replacement name for *Hylaplesia*. Therefore the problems raised by DUBOIS (D-18) concerning the validity of the names *Dendrobates* and Dendrobatidae remain, and must be solved by an action of the ICZN.

Source MNHN, Paris

In conclusion the generic names *Asterodactylus*, *Dendrobates*, *Enydrobius*, *Systoma*, *Bombitator*, *Calamites* and *Megalophrys* are all new replacement names (or, if one prefers, unjustified emendations, for the last three ones) for existing generic names which were believed by WAGLER (1827, 1830 b) to be invalid because they were not of strict classical Latin or Greek origin. They have therefore by definition the same type species as the replaced names, and SAVAGE's (1986) analysis is in error.

OTHER PROBLEMS RAISED BY SAVAGE (1986) IN GENERIC NAMES

(1) *Cacopus* Gunther, 1864. - As already tackled above, the analysis of this case presented by SAVAGE (1986 : 261) is clearly in error. He states that *Cacopus* is a replacement name for *Hyperodon*, "an incorrect subsequent spelling (which has no status) as *Uperodon* is an available name". SAVAGE (1986) clearly mingles two very different things : the fact that an author has intentionally introduced a new spelling (emendation) or a new name (nomen novum), because he *believes*, for some reason, that the original name is incorrect or invalid ; and the fact that this action is or not *justified* according to our current rules. It is perfectly true that *Uperodon* Duméril & Bibron, 1841 is an "available name" and that, according to the 1985 *Code* (and also to the preceding editions), it does not have to be emended. But this has no bearing on the question whether GÜNTHER (1864) intentionally decided to replace it! As a matter of fact, GÜNTHER (1864 : 415) did clearly and explicitly state that he did so and why : "The correct spelling of this word would be *Hyperodon*, a name long previously given to a genus of Cetaceans. Besides, these frogs have no vomerine teeth." This means that : (1) GÜNTHER (1864) considered (in error, but this needs not concern us here) the spelling *Uperodon* to be invalid because incorrectly formed, in his opinion, from the Greek root ; (2) he stated that the correct spelling of this name should be *Hyperodon* ; (3) but he immediately added that this latter name was also invalid, being preoccupied ; (4) furthermore, he added that this name was inappropriate for the frogs in question, because it did not correspond to the real biological properties of these animals ; (5) consequently, he proposed the replacement name *Cacopus* for this genus. Only two interpretations of this case are possible. The first one, which I had proposed (D-26), is simply to consider *Cacopus* as a replacement name for *Uperodon*. As a matter of fact, (1) GÜNTHER clearly considered this latter name as invalid, and (2) he only mentioned the spelling *Hyperodon* as the potential correct spelling of this name, but not as a valid name. However, if one wishes strictly to follow the very formal proposal of SAVAGE (1986) that *Cacopus* be considered a replacement name for *Hyperodon*, then the latter name must be considered an unjustified emendation of *Uperodon*, that must be credited to GÜNTHER (1864), but cannot in the least be viewed as an incorrect subsequent spelling! This much more formal solution, although it does not change the final result, is less logical, because it credits GÜNTHER (1864) with a name which he himself rejected in the very work where he created it.

(2) *Philautus* Gistel, 1848. - Concerning this name, SAVAGE (1986 : 261) writes : "I have not seen the original descriptions (sic) of the latter name but suspect it does not qualify as a new replacement name." This statement sounds quite strange to me.[2] Personally, when I

2. I am even surprised that the journal *Copeia* should have published this sentence

Source MNHN, Paris

have not seen a publication, I either try to obtain and see it by myself, or, when this proves impossible, I use second-hand information It is true that such information may sometimes be in error (and this is the reason why I always try my best to obtain the original paper), but, at least, it is better than no information at all. SAVAGE (1986) seems to act differently. He apparently does not try seriously to see the original publication (for if he had, he certainly could have succeeded, for example by writing, as I have done in this case, to the British Museum library), and he a priori mistrusts the information given in a recent paper by a colleague, who furthermore stated that he had *seen* the original paper (since, as is easy to verify, I always state in the bibliographies of my papers when I have *not seen* a given publication). This is a strange attitude. Disappointing as it may be for SAVAGE, I must precise that here again he is in error. To avoid repetition of this error, I am obliged to give here more details about GISTEL's (1848) work. That may be useful to all batrachologists.

In the introduction of his book, GISTEL (1848 : viii-xi) presents a very long alphabetical list of generic names, for most of which he proposes new replacement names. The way names are presented may be illustrated by the following example, at the beginning of the list : "*Acanthoderus* (Palisot de Beauvois. Wanze : *Lygaeus sanctus*) bleibt ; aber *Acanthoderus* (Serv. Cerambycid.) heißt : *Scamillus* (Nob.)." This means that the first genus name cited *stands* (bleibt), while the second one is replaced by another one, and *is (re)named* (heißt) *Scamillus*. The words "bleibt" and "heißt", which appear in the first examples, are either abbreviated ("bl." for "bleibt") or omitted ("heißt") in the following of the text ; the word "Nobis" is abbreviated first in "Nob.", then in "N.". Other replacement names are also proposed in a slightly different manner in footnote 19 of p. xi.

As far as the name *Philautus* is concerned, it appears as follows on p. x of GISTEL (1848) : "*Orchestes* (Illig. Kaf.) bl. - *Orchestes* (Tschudi, Isis 1838. 853.) : *Philautus*, N. - *Orchestes* (Costa Cenni, Crustac.) : *Encopis*, N." This is a clear indication that *Philautus* Gistel, 1848 is proposed as a new replacement name for *Orchestes* Tschudi, 1838, because the latter is preoccupied by *Orchestes* Illiger, 1798 (and by *Orchestes* Leach, 1830) (see D-11).

In view of the rarity of GISTEL's (1848) text, I felt it useful to prepare and give here a complete list of the replacement names proposed in this book for amphibian genera (the same work should also be done for other groups), most of which have not been recently cited (see Table II). These names should be included in the synonymies of their respective genera, as was done by DUBOIS (D-11) in Ranoidea. Apart from *Philautus*, the only one of these names to have been considered to be valid in the recent years is *Hydromantes* ; however this name was recently shown to be invalid (D-24).

(3) *Astrodactylus* [Hogg, 1838]. - Contrary to SAVAGE (1986), this name is an unjustified emendation of *Asterodactylus* Wagler, 1827, not an incorrect subsequent spelling, by virtue of criteria (C2), (C4) and (C6) above. As a matter of fact, both this spelling and the original one have an etymological jusitification : *Astrodactylus* is based on the Latin word *astrum*, derived from the Greek ἄστρου, while the original spelling *Asterodactylus* was based on the Latin word *aster*, derived from the Greek ἀστήρ. Both *astrum* and *aster* mean "star", and this refers to the shape of the extremities of the fingers of these animals. Besides, in all his papers, HOGG (1838, 1839 a, 1839 b, 1841) always used the spelling *Astrodactylus* (and the derived spelling Astrodactylidae) for the name of these animals, and never reverted to the original spelling *Asterodactylus*. However HOGG was clearly aware of the original spelling, which he

Source MNHN, Paris

Table II. – New replacement names for generic names of amphibians created by GISTEL (1848).

New replacement name	Page in GISTEL (1848)	Original generic name	Recent reference to GISTEL's (1848) name
Baryboas	xi	*Pelophilus* Tschudi, 1838	
Borborocottes	xi	*Palaeobatrachus* Tschudi, 1838	
Bradytes	xi	*Bradybates* Tschudi, 1838	
Buccinator	xi	*Boophis* Tschudi, 1838	D-11
Cotobotes	xi	*Hemidactylium* Tschudi, 1838	
Dendricus	viii	*Buergeria* Tschudi, 1838	D-11
Dendromanes	xi	*Microhyla* Tschudi, 1838	
Dendromedusa	xi	*Hylaplesia* Boie in SCHLEGEL, 1827	
Epipole	ix	*Eucnemis* Tschudi, 1838	D-11
Hydromantes	xi	*Geotriton* Bonaparte, 1832	D-24
Hydroscopes	xi	*Pseudosalamandra* Tschudi, 1838	
Limnarches	xi	*Ambystoma* Tschudi, 1838	
Pelida	xi	*Hyladactylus* Tschudi, 1838	
Pelodytes	xi	*Pseudotriton* Tschudi, 1838	
Philautus	x	*Orchestes* Tschudi, 1838	D-11, D-26
Phyllodytes	xi	*Cornufer* Tschudi, 1838	D-11
Polyphone	xi	*Ranoidea* Tschudi, 1838	
Pyleus	xi	*Pseudobufo* Tschudi, 1838	
Tritogenius	xi	*Andrias* Tschudi, 1837	
Troglobates	xi	*Palaeophrynos* Tschudi, 1838	
Xiphoctonus	xi	*Xiphonura* Tschudi, 1838	
Zoodioctes	xi	*Hylarana* Tschudi, 1838	D-11

cited when he commented (HOGG, 1839 a : 268) on WAGLER's (1830 b) book where this spelling appears. There can therefore be no doubt about the intentionally of his act.

(4) *Lophiohyla* Miranda-Ribeiro, 1926. - Quite funnily, SAVAGE (1986 : 261) writes concerning this name : "*Lophiohila* (sic) Miranda-Ribeiro, 1926 is an incorrect subsequent spelling." In reality, the spelling which appears in MIRANDA-RIBEIRO's (1926) work is not *Lophiohila*, but *Lophiohyla*. This name must be considered an unjustified emendation of the original spelling *Lophyohyla* (for more detail, see D-26 : 21-22), by virtue of criterion (C5): this name appears several times in MIRANDA-RIBEIRO's (1926) work, and again once in a subsequent paper (MIRANDA-RIBEIRO, 1937), while the original spelling of the names does not appear any more in these texts. This name is clearly based on *Hyla*, but the etymology of the element *lophio* is unclear to me : it seems to be derived from the Greek λοφιά (mane), which does not make sense to me. However, there can be no doubt about the intention of MIRANDA-RIBEIRO to use the spelling *Lophiohyla* for this genus, and the spelling must be considered an unjustified emendation. As for the spelling *Lophiohila*, cited by SAVAGE (1986), it is a new spelling. I admit however perfectly that it is to be considered as an incorrect subsequent spelling, without status in nomenclature, just like the three other new and incorrect spellings which appear in various parts of his paper (*Cycloramphis*, Phrynobatracinae, Petropedetine).

(5) *Myiobatrachus* [Bonaparte, 1850]. - Contrary to SAVAGE (1986), this name must be considered an unjustified emendation of *Myobatrachus* Schlegel, 1850, not an incorrect sub-

Source MNHN, Paris

sequent spelling, by virtue of criteria (C4), (C5) and (C6). As a matter of fact, both this spelling and the original one have an etymological justification : *Myobatrachus* is based on the root *myo-*, derived from the Greek μῦς, μυός (rat, mouse ; muscle) ; *Myiobatrachus* is based on the root *myio-*, derived from the Greek μυῖα (fly). Besides, BONAPARTE (1850, 1852 b) used the spellings Myiobatrachidae and Myiobatrachina in two different papers (see D-26 : 22), and the spelling *Myiobatrachus* was accepted as valid by the very author of the original name *Myobatrachus*, SCHLEGEL himself (1858).

(6) *Cyclorhampus* Agassiz, 1846. - This spelling is considered by SAVAGE (1986) as an incorrect subsequent spelling of *Cycloramphus* Tschudi, 1838, but it is in fact an unjustified emendation of this latter name, as shown by types (C2) and (C4) of evidence. In TSCHUDI's (1838) text, this generic name was spelled *Cycloramphos* on p. 41 and *Cycloramphus* on p. 81. AGASSIZ (1846 : 110) cites both these spellings, and, in front of each of them, writes "*C-rhamphus*" between parentheses. This is a clear indication that he considered *Cyclorhamphus* as the only justified spelling for this name, which should in his opinion replace both original spellings. The reason for that is clearly the recourse to the etymology, this name being based on the Greek word ῥάμφος (beak), which is correctly latinized into *rhamphus*.

(7) *Alytes* Wagler, 1829. - For this name, SAVAGE (1986 : 261) most strangely writes : "the type species of *Alytes* Wagler, 1829, is *Bufo obstetricans* Laurent (sic), 1768, by indication (Art. 12b.5)". This is perfectly true, but by no means contradictory to what I had written (D-26 : 18), which SAVAGE does not seem to have understood. I therefore give here a translation of the relevant part of my discussion on this question : "In the first text where the generic name *Alytes* appears (WAGLER, 1829 : 70), this name is accompanied by no description or diagnosis, but is presented in the combination *Alytes obstetricans*. The name *Bufo obstetricans* Laurenti, 1768 being at this epoch the only existing specific name which could apply to this taxon (see SHERBORN, 1902 : 682), one may consider that the name *Alytes* is available as from 1829, with *Bufo obstetricans* Laurenti, 1768 for type species by monotypy One could also consider this indication as insufficient, the name *obstetricans* not being defined by the mention of his author and date : in this case, *Alytes* would be a nomen nudum in WAGLER (1829), and would only obtain a status in nomenclature with the publication by WAGLER (1830 a : [53], pl. XXII) of a description and of figures showing the species *Alytes obstetricans* (Laurenti, 1768)." (D-26 : 18). My concern here was whether the specific name *obstetricans* mentioned by WAGLER (1829) was to be considered as a new name, which would then be a nomen nudum, or as a subsequent use of the specific name *Bufo obstetricans* Laurenti, 1768. It is true that the subsequent publications of WAGLER (1830 a, 1830 b) demonstrated without ambiguity that it was this latter name which had been used by WAGLER (1829), but, had these subsequent works never appeared, there would be no evidence at all in the original paper itself (WAGLER, 1829) for this interpretation. The only evidence which could be used *at this date* was the fact that *Bufo obstetricans* Laurenti, 1768 was the only specific name *obstetricans* which existed then in the whole animal kingdom. These are subtle matters, I admit, but which should not discourage a truly serious student of nomenclatural problems.

(8) "*Elosia nasuta* Tschudi, 1838". - This is the last of the examples cited by SAVAGE (1986 : 261) to demonstrate that "it behooves any user of Dubois' paper to review the original literature to determine if a particular name is an emendation or an incorrect spelling." While I am not embarrassed by this suggestion, I think this example clearly shows that the

Source MNHN, Paris

batrachologists interested in suprageneric nomenclature of amphibians should consult my work directly, rather than SAVAGE's (1986) comments upon it, which are based on an approximate (and sometimes completely erroneous) understanding of its content. As a matter of fact, SAVAGE (1986 : 261) writes : "Other corrections that need to be mentioned regarding the genera discussed by Dubois are : (...) d) the name *Elosia nasuta* Tschudi, 1838, is an incorrect subsequent spelling." Now, here is the exact translation of my own comment on this question : "GORHAM (1966 : 111) and LYNCH (1971 : 166) believe that there exists a nominal species *Elosia nasuta* Tschudi, 1838. In fact, the binomial *Elosia nasuta* which appears in TSCHUDI's (1838 : 77) work is clearly a new combination proposed for the nominal species *Hyla nasus* Lichtenstein, 1823. The spelling *nasuta* used by TSCHUDI (1838) for the specific name cannot be held to be an unjustified emendation of the name *nasus* Lichtenstein, 1823, but must be regarded as an incorrect subsequent spelling, devoid of nomenclatural status (the same is true for the spelling *nasulus*, which also appears in TSCHUDI's 1838 work)." I think this needs no additional comment.

VALID FAMILY-GROUP NAMES

While SAVAGE (1986) tends to favor a very strict, restrictive and even rigid conception of the *Code* regarding the status of new replacement names, he adopts the reverse attitude concerning the validity of family-group names. In this case he clearly praises a return to pre-*Code* rules, since he does not admit the principle or priority for these names. As a matter of fact, he challenges the use of some family-group names which I consider valid on the basis of this principle. In particular, he suggests that Dactylethrinae Hogg, 1838 should be replaced by Xenopodinae Fitzinger, 1843, and that Tornieriobatinae Miranda-Ribeiro, 1926 should be replaced by Nectophryninae Laurent, 1942. He seems also, though less clearly, to suggest that Petropedetinae (which he qualifies as "widely used") should be given priority over Phrynobatrachinae. Although this point is only slightly tackled by SAVAGE (1986) in this paper, it is of importance, because it is clear that SAVAGE's opinion in this respect was accepted or shared by the editors of *ASW*, and one may in fact find in SAVAGE's (1986) paper the "theoretical" justification for some of the decisions taken in *ASW* concerning the valid names of some family-group taxa, which I already commented upon elsewhere (D-41).

As I already pointed out (D-26 : 6), MYERS & LEVITON (1962 : 290) rightly stressed that one of the causes of instability of familial nomenclature in zoology stems from the fact that several conceptions have existed as to the rules which should be followed to determine the valid name of a family-group taxon. Thus, according to the various "rules" followed in the past by different authors, the name retained as the valid one may have been : (R1) the family-group name based on the *oldest available genus-group name* belonging to the family-group taxon in question ; (R2) the family-group name based on the *oldest valid genus-group name* of the family-group taxon in question ; (R3) the *first family-group name* to have been used with a *correct spelling* (suffix in - idae or - inae) ; (R4) the *oldest family-group name* ever proposed for this group, even when it was then incorrectly formed (suffix in -ae, -ida, -ina, -ides, etc.). The experience shows that the use of rules (R1) and (R2) leads to catastrophic consequences as to the stability of family-group names. As a matter of fact, under such rules, very limited taxinomic changes may lead to a change of name for the family-group taxon :

Source MNHN, Paris

in case (R1) this may be caused by the simple addition to or substraction from this taxon of a genus the name of which is older than all the other generic names of the group ; in case (R2) this may be caused by the simple fact that a generic name, once considered valid, be rejected as a junior homonym or (subjective or objective) synonym, or on the reverse retired from synonymy. Rule (R3) would not do justice to the fact that in older times there was no rule as to the correct spelling of family-groups names and that nevertheless authors of this epoch, although using spellings which are currently considered incorrect, clearly created family-group names and should be credited with the authorship of these names. Rule (R4) is the one that ensures the highest stability possible for family-group names and credits these names with their proper authors. As I had stressed in my 1984 paper (D-26), the rules then in force according to the second edition of the *Code* (ANONYMOUS, 1964, 1974) were excellent, because they allowed a maintenance of the stability of family-group nomenclature even when minor changes were introduced in the generic content of a family-group taxon or in the status of some generic names Unfortunately, as commented above in detail, the changes brought to Art. 32, 35 and 39 in the 1985 *Code* are highly open to criticism and should in my opinion be reconsidered.

Some comments are necessary here concerning Art 40 of the *Code*, which is called upon by SAVAGE (1986) and also in *ASW* to justify certain decisions taken by these authors. The relevant parts of this Article are as follows :

"*Article 40. Synonymy of the type genus.* -

(a) *After 1960.* - When, after 1960, the generic name on which a valid family-group name is based is rejected as a junior synonym, that family-group name is not to be replaced (...).

(b) *Before 1961* - If a family group name has been replaced before 1961 because of such synonymy, and the replacement name has won general acceptance, it is to be maintained.

(..)

(ii) in the event of divergent interpretations of the expression "general acceptance", the case is to be referred to the Commission for a decision." (ANONYMOUS, 1985 a : 81)

Some comments on this article seem appropriate here. First of all, it is clear that this article was devised in order to limit the nomenclatural disturbances which would be entailed by a too strict application of the principle of priority in the family-group, since in the past many authors in fact had followed the rule (R2) above. However, this partial suspension of the principle of priority to family-group names is limited in time, since it applies to actions *prior to 1961*. The aim of setting this limiting date is clear : it is to ensure that, from 1961 on, the principle of priority strictly applies to family-group names, as well as to genus-group and species-group names. It should therefore be clear that this article only applies to family-group names *which have been proposed and have won general acceptance before 1961*, and cannot even be considered as potentially applicable to names either proposed or generally accepted after that date. Thus for example this article cannot in the least be called upon to conserve the name Ichthyophiidae Taylor, 1968, which was proposed after 1960 and is a junior synonym of Epicriidae Fitzinger, 1843 It could not either be called upon to conserve Bombiminae Fejerváry, 1921, which has been used only once before 1961 (D-37) and is a junior synonym of Bombinatorinae Gray, 1825, a name which has had a large use in the XIX century, and is the valid name of the subfamily, if one wishes to recognize it as a distinct taxon (D-19, D-26, D-29, D-35, D-39).

Source MNHN, Paris

A second comment is that Art. 40 only applies to the case where a family-group name, based on a generic name rejected as a junior synonym, is replaced by a family-group name based on the generic name which is the senior synonym of the rejected generic name (as in the example given in Art. 40 of the *Code*). Thus this article could not apply in the case of Petropedetinae versus Hemimantinae, even if, which is far from being true, the name Petropedetinae had "won general acceptance" before 1961.

Finally, it is important to note that in the case of disagreements between different authors as to the fact that a name has or not "won general acceptance", the ICZN alone is enabled to take a decision. In other words, in such cases it is the responsability of those who believe, contrary to others, that Art. 40 may be called upon to conserve a more recent name, to submit an application to the ICZN and give evidence that this recent name has "won general acceptance". Unless they do it, the principle of priority must apply in these cases as in general.

The proposals of SAVAGE (1986) may now be considered in the light of these comments.

The case of Dactylethrinae versus Xenopodinae was already discussed elsewhere (D-41) I contend that the name Xenopodinae was only very rarely used before 1961, and even before 1986, and that it cannot be considered as having "won general acceptance". The name Dactylethrinae, which has been more largely used than this latter name and which has priority, should be conserved for this taxon. I feel it useless to discuss this problem in more detail here and to give lists of bibliographic references in support of my assertions as long as nobody deems it justified to submit officially this problem to the ICZN.

The case of Petropedetinae was also discussed elsewhere (D-41). SAVAGE (1986) qualifies this name as "widely used", but does not produce evidence for this statement : as shown elsewhere (D-41), I can list 11 references to use of this name, versus 35 references to use of Phrynobatrachinae. Furthermore, Art 40 cannot be called upon in this case, for the reasons developed above, and an action of the ICZN is necessary here if the name Hemimantinae is to be rejected.

Finally, the most striking case is that of the names Tornieriobatinae and Nectophryninae. SAVAGE (1986 : 261) writes : "Art. 40b is marginally applicable here since the subfamily has been rarely recognized, nevertheless I would favor use of Nectophryninae." Actually, it is misleading to say that the subfamily "has been rarely recognized", since I personally know only two publications where it was recognized before my own works (D-14, D-19, D-26, D-29, D-35) : that of MIRANDA-RIBEIRO (1926) where he created the name Tornieriobatinae, and that of LAURENT (1942) where he created the name Nectophryninae! This latter author himself seems to have never used again this name, or recognized this subfamily, in subsequent publications. Even if I missed a few papers where these names were used, it is clear that it is impossible to speak in such a case of "general acceptance" before 1961, or even before 1986. Art. 40 is therefore not applicable *at all* in this case, not "marginally applicable", and the name Tornieriobatinae must remain the valid name of the taxon, if the latter is to be recognized.

This last example has the merit to clearly tell us what is the philosophy of SAVAGE concerning the validity of family-group names. He in fact favors the rule (R2) above, and considers that, as far as possible, one should suppress family-group names which are based on

Source MNHN, Paris

generic names currently considered junior synonyms of valid names He then tries to use Art. 40 for this purpose, and not for the real purpose of this article, which is to *protect the stability of nomenclature* by conserving *well-known* and *widely used* names. It is also clear that it is for this same reason that SAVAGE (1973 354) used the name Platymantinae for the taxon named Cornuferinae by NOBLE (1931 521), after the ICZN had decided, in a very disputable Opinion, to consider the name *Cornufer* as a junior synonym of *Platymantis* (for a more detailed discussion of these points, see DUBOIS, D-11).

The exactly same philosophy is adopted in *ASW*, and I now understand better, in the light of SAVAGE's (1986) paper, some of the choices made in this list (concerning e.g the names Xenopodinae and Petropedetinae), or the strange statement on p. 105 of *ASW*, which had elicited my surprise (see D-41), that Alytidae was the first available name for the family currently known as Discoglossidae, while I had clearly shown that the first available name for this taxon was in fact Bombinatoridae : it is because, this latter name being based on a junior synonym, it was simply considered by the authors of *ASW* as virtually non-existant! However, as I discussed in detail elsewhere (D-26, D-37), these matters are not so simple, and such practices cannot be accepted.

The refusal of respecting the principle of priority for family-group names has important consequences. It is almost equivalent to a refusal of accepting that family-group names be ruled by the *International Code of zoological Nomenclature*, and is therefore a step backward, contrary to the tendency which has always been increasing to elaborate and use precise rules for the use of names in systematics. It should therefore not be accepted by taxinomists who wish to work for a stable system of nomenclature of living beings.

Incidentally, this case also throws a light on another type of errors which had struck me in *ASW*, and which is mentioned elsewhere (D-41), but the reasons for which I had not really understood. Thus for example this list states that the type species of the genus *Leptodactylus* is *Rana fusca* Schneider, 1799, while it is in fact *Rana typhonia* Latreille *in* SONNINI & LATREILLE, 1801. The reason of this mistake is the same as that just discussed for family-group names : since this latter name is currently considered a subjective junior synonym of the former one (HEYER, 1968 ; LYNCH, 1971), the authors of *ASW* replaced the true name of the type species of the genus by the valid name of this species. This clearly shows a confusion between the concepts of nominal species and of biological species : two different nominal species may be considered to be the same biological species, they nevertheless remain distinct nominal species, and the type species of genera are nominal species, not biological species[3] A symmetrical case is that e.g. of *Necturus*, where the reverse mistake was done : *ASW* considered FITZINGER's (1843, designation of "*Nectur. lateralis* Wagl " (in fact *Triton lateralis* Say, 1823) as type species of this genus to be valid because this name is currently considered a subjective synonym of *Sirena maculosa* Rafinesque, 1818. However, the nominal species *Triton lateralis* was not part of the originally included species of *Necturus* Rafinesque, 1819, and is not eligible for type fixation in this genus Therefore, BROWN (1908,

3. This is not understood e g by ZHAO 1984 , who states that the type species of the genus *Liua* Zhao & Hu, 1983 should move from *Ranodon wushanensis* Liu, Hu & Yang, 1960 to *Hynobius shihi* Liu, 1950, since the former is a synonym of the latter both nominal species may be synonyms RISCH & THORN, 1982 , the former nevertheless remains the type species of the genus *Liua*, by original designation Let us note also that the name *Liua* is misspelled *Liuia* in *ASW* pp 565-566

Source MNHN, Paris

is the author of the valid type species designation (see Table VII in D-41). Other mistakes of this type may exist in *ASW*, where I have not looked especially for them.

Classification used

This last point deserves little comment, except that it is in error that, concerning the few changes that I had proposed (D-19, D-26, D-29) to Laurent's (1980 a) classification scheme, Savage (1986 : 262) writes : "The bases for these decisions are not discussed " It should be clear that my paper (D-26) was dealing with *nomenclatural* problems, not with classification itself. However, nomenclature is meaningful and can be used only on the basis of a classification, and I had to choose one, even if I did not ignore that it could not be the "definitive" one! I chose Laurent's (1980 a, 1986 a) scheme and made clearly reference to it. In the few cases where I introduced (slight) changes, in particular in the recognition of subfamilies, I clearly gave *references* to works justifying these choices (Discoglossidae, pp. 24-26 ; Pipidae, p. 27 ; Pelobatidae, pp. 28-29 ; Bufonidae, pp. 33-35). I should stress that in all these cases I proposed these changes as tentative, but only using already existing names, in order not to create new taxa or names. In one case I even used voluntarily an artifice in order not to create a new name. This is the case of the subfamily I suggested to recognize for East Asian bufonids (including the genera *Ansonia*, *Bufoides*, *Leptophryne*, *Pedostibes*, *Pelophryne*, *Pseudobufo*). No family-group name, based on one of these family-group names or on a synonym of one of them, exists at present, and I could certainly have created one. However, since we clearly still lack much information to prove that this group is really homophyletic, I refrained from doing so, and used the following artificial solution. There currently exists a family-group name Adenomidae Cope, 1860, based on the generic name *Adenomus* Cope, 1860 The type species of this nominal genus is *Adenomus badioflavus* Cope, 1860, a name which currently stands in the synonymy of the name *Bufo kelaartii* Gunther, 1859. Finally, Inger (1972 : 360) has suggested that this latter species, from Ceylon, might have to be retired from the genus *Bufo* and placed in a genus of its own. I therefore proposed to *provisionally* use the name Adenominae Cope, 1860 for the subfamily of East Asian bufonids, pending further studies on the statuts of *Bufo keluartii* and of the other species of this group. This action has the double advantage of avoiding the premature creation of a family-group name for a poorly known group, but also to draw the attention to the interest of a study of relationships within this group and between this group and other bufonids, and I hope it will prompt studies in this field. This is clearly a more economical and prudent attitude than that of many other authors, not only in the past but also in recent years, like e.g. Savage (1973), who proposed two new family-group names (Allophrynidae, Platymantinae) for taxa which were not even defined or diagnosed, and the validity of which was not at all demonstrated in his work (actually, the second of these taxa is clearly heterogenous and invalid, at least as proposed by Savage ; see D-2, D-11, D-35).

Conclusion

After this detailed analysis, I regret to say that I must reject as wrong *all* the corrections proposed by Savage (1986) to my list of suprageneric and generic names of anuran

Source MNHN, Paris

amphibians (D-26), and that I reject his statement that "the materials (especially the generic lists) presented [by Dubois] require considerable modification." This does not mean that this latter work contained no mistakes or omissions, but these were all missed by SAVAGE (1986). Since my work was submitted for publication, and apart from the changes made necessary by the new *Code*, which were "corrected" elsewhere (D-29), I have found 7 errors and 5 omissions in it. Four of the errors concern the first use of subsequent spellings of family-group names : the spelling Centroleninae was first used by BRATTSTROM (1957 : 73), not LUTZ (1969 : 276) ; the spelling Phrynomeridae was first used by PARKER (1932 : 1241), not PARKER (1934 : 9) ; the spelling Ranini was first used by BONAPARTE (1839 : [225]), not BRONN (1849 : 684) ; the spelling Ranidi was first used by BONAPARTE (1837 : [248]), not ACLOQUE (1900 : 489). The fifth error concerns the author of the first family-group name based on the generic name *Rana*, which proves to be GOLDFUSS (1820), not GRAY (1825) (see DUBOIS, D-29). The two remaining errors concern the family-group names Allophrynidae and Platymantinae, created by SAVAGE (1973): I had not realized that these names were not accompagnied by any diagnosis and are therefore nomina nuda in this work ; the first one obtained a status in nomenclature in GOIN, GOIN & ZUG's (1978) work (see DUBOIS, D-31), and the second one, which is a junior synonym of Dicroglossidae Anderson, 1871 (see DUBOIS, D-26, D-35), obtained a status in nomenclature, under the spelling Platymantini, in LAURENT (1986 a : 760) As for the omissions, four of them also concern subsequent spellings of family-group names : I had missed the spelling Pelobatidea, due to HUXLEY (1871 : 189), and the spellings Pipini, Bufonini and Hyladini, used by BONAPARTE (1839 : [225]). Finally, I only recently (D-35) rediscovered the family-group name Colodactyli Tschudi, 1845, which should now stand in the synonymy of the name Discoglossidae, and entails a change of date for this name.

The total number of names mentioned in my checklist (D-26) being 572, the total EO rate for this whole work is therefore of 2 1% (E rate : 1.2% ; O rate : 0.9%), which seems acceptable according to the a priori criterion proposed elsewhere (D-41). A few additional mistakes or omissions certainly remain to discover, but this should not significantly alter these figures.

RÉSUMÉ

L'auteur répond aux critiques diverses récemment émises par SAVAGE (1986) sur ses propres travaux (notamment DUBOIS, 1984), et montre que celles-ci sont dues à de graves incompréhensions de plusieurs importantes règles de nomenclature Une attention particulière est accordée aux problèmes posés par la distinction entre différents types de noms et d'orthographes (nouveau nom, nouveau nom de remplacement, émendation injustifiée, orthographe subséquente incorrecte), et plusieurs exemples sont traités en détail. Il est montré que certaines des suggestions de SAVAGE (1986) concernant les noms du groupe-famille reviennent en réalité à une proposition de retour à des règles antérieures à celles du *Code international de Nomenclature zoologique* pour ces noms, puisque cet auteur n'accepte pas l'application du principe de priorité à ces noms. La question des règles suggérées par DUBOIS (1984) pour la nomenclature des taxons du groupe-classe est aussi discutée, et les modifications récemment proposées à cet égard par LESCURE, RENOUS & GASC (1986) sont critiquées

Source MNHN, Paris

LITERATURE CITED

Note . — To save space, the references to the works cited above which are given in the papers D-8, D-11, D-25, D-26, D-29 and D-41 are not repeated here (the references D-1 to D-40 are given in D-41).

BISCHOFF, W., 1982 – Die innerartliche Gliederung von *Gallotia galloti* (Duméril & Bibron 1839) (Reptilia . Sauria : Lacertidae) auf Teneriffa, Kanarische Inseln. *Bonn. zool. Beitr.*, **33** . 363-382.

BONAPARTE, C. L., 1837. – *Salamandra maculosa*. Salamandra pezzata. *In* . *Iconografia della fauna italica per le quattro classi degli animali vertebrati*, vol. II, [fasc XIX], Roma, Salviucci : [245-250], pl. [52].

----- 1839 – *Bufo vulgaris*. Rospo comune. *In* : *Iconografia della fauna italica per le quattro classi degli animali vertebrati*, vol. II, [fasc. XXIV], Roma, Salviucci : [223-228], pl. [49].

BOUR, R. & DUBOIS, A., 1986. Nomenclature ordinale et familiale des tortues (Reptilia). Note complémentaire. *Bull. Soc. linn. Lyon*, **55** : 87-90.

BRATTSTROM, B. H , 1957 – The phylogeny of the Salientia based on skeletal morphology. *Syst. Zool.*, **6** : 70-74.

CLARKE, B. T., 1983. – A morphological re-examination of the frog genus *Nannophrys* (Anura : Ranidae) with comments on its biology, distribution and relationships. *Zool. J. Linn. Soc* , **79** : 377-398.

CUELLAR, H. S., FAWCETT, J D., FERNER, J. W , MASLIN, P , OLDHAM, J C., ROTH, J. J., SAVITZKY, A. & SMITH, H.M., 1972. – Comment on *Dendrobates*. Z.N.(S.)1930. *Bull. zool. Nom.*, **29** : 24.

DUBOIS, A., 1987 (D-41) – Living amphibians of the world · a first step towards a comprehensive checklist. *Alytes*, **5**: 99-149.

----- 1984 (D-42). – Les specimens-types de *Gallotia galloti* (Oudart, 1839) (Reptiles, Sauriens). *Bull. Soc. linn. Lyon*, **53** : 27-30

DUPUIS, C., 1984. – Explication du vote sur le projet de la troisieme edition du Code international de Nomenclature zoologique. Z.N (G)197. *Bull. zool. Nom.*, **41** : 141-148.

GRAY, J. E., 1842. – The northern zoological gallery *In* *Synopsis of the contents of the British Museum*, 44th. ed., London, British Museum : 97-157.

HOGG, J., 1839 a. – On the classifications of the Amphibia. *Mag. nat Hist* , (n.s.), **3** : 265-274.

----- 1839 b. – On the classifications of the Amphibia (continued). *Mag. nat. Hist* , (n s), **3** . 367-378.

----- 1841. – On the existence of branchiae in the young *Caeciliae* ; and on a modification and extension of the branchial classification of the Amphibia. *Ann. Mag nat. Hist.*, (1), **7** : 353-363.

HOLTHUIS, L. B , 1983. – Comments on the proposed conservation of *Dendrobates* Wagler, 1830 and Dendrobatidae Cope, 1865. Z.N (S)1930. *Bull. zool. Nom.*, **40** : 197-198.

HUXLEY, T. H , 1871. – *A manual of the anatomy of vertebrated animals* London, Churchill : i-vii + 1-510

LESCURE, J., 1982. – L'espèce-type du genre *Dendrobates* Wagler, 1830 : nouvelles propositions. Z.N.(S.)1930. *Bull. zool. Nom.*, **39** : 264-267

LESCURE, J., RENOUS, S. & GASC J.-P., 1986. – Proposition d'une nouvelle classification des Amphibiens Gymnophiones. *Mem Soc. zool. France*, **43** : 145-177, 1 tab.

MALHERBE, M., 1983. – *Les langages de l'humanite*. Paris, Seghers : 1-444.

MICHAHELLES, C , 1833. – Waglers Synonymie der Sebaischen Amphibien. *Isis von Oken*, **1833** . 884-905.

MYERS, C. W & DALY, J. W., 1971. – Comment on the proposed designation of a new type-species of *Dendrobates* Wagler, 1830. Z.N.(S.)1930. *Bull zool. Nom.*, **28** : 141

PARKER, H. W., 1930 a. – Report on the Amphibia collected by Mr. J Omer-Cooper in Ethiopia. *Proc zool. Soc. London*, **1930** : 1-6.

----- 1930 b. A collection of frogs from Portuguese East Africa. *Proc zool Soc London*, **1930** · 897-905, pl. I

----- 1932. Parallel modifications in the skeleton of the Amphibia Salientia. *Arch zool ital* , **16** · 1239-1248.

Source MNHN, Paris

----- 1936 a. – The Amphibians of the Mamfe Division, Cameroons. I. Zoogeography and systematics. *Proc. zool. Soc. London*, **1936** : 135-163, pl. I.

----- 1936 b. – Dr Karl Jordan's expedition to South-West Africa and Angola · herpetological collections *Novit. zool.*, **40** : 115-146.

----- 1937. – Reptiles and Amphibians from the Mafia archipelago. *Ann. Mag nat Hist.*, (10,, **20** :629-632

PETERS, J. A., DUELLMAN, W. E., LYNCH, J. D , MYERS, C.W., SAVAGE, J. M. & WALKER, C F., 1972 – Comment on the proposed designation of type-species for the Amphibian genus *Dendrobates*. Z.N.(S.)1930. *Bull. zool. Nom.*, **29** : 107-108.

RISCH, J.-P. & THORN, R., 1982 – Notes sur *Ranodon shihi* (Liu, 1950, (Amphibia, Caudata, Hynobiidae). I. Taxonomie. *Bull. Soc Hist. nat Toulouse*, 1981 (1982), **117** : 171-174.

SAVAGE, J. M., 1986. – Review of DUBOIS, 1984 e (D-26). *Copeia*, **1986** : 259-262

SCHUCHERT, C. & BUCKMAN, S. S., 1905. – The nomenclature of types in natural history. *Ann Mag. nat. Hist.*, (7), **16** : 102-104.

SHERBORN, C. D., 1928. – *Index animalium*. 1801-1850. Fasc. 15 (M, N). London, British Museum 3747-4450.

SILVERSTONE, P A., 1971. - *Dendrobates* Wagler, 1830 (Amphibia · Anura). proposed designation of type-species under the plenary powers. Z.N.(S)1930. *Bull. zool. Nom.*, **27** : 262-264.

STARRETT, P. H., 1973 – Evolutionary patterns in larval morphology *In* . J L VIAL (ed.), *Evolutionary Biology of the Anurans*, Columbia, Univ. Missouri Press : 251-271

STEJNEGER, L., 1937. – Designation of genotype for *Hylaplesia* Boie. *Copeia*, **1937** : 139

ZHAO, E., 1984 – The nomenclature of the type species of the genus *Liua* should be revised *Acta herpet. sinica*, **3** : 40.

Source MNHN, Paris

Alytes, 1987, **6** (1-2): 56-68.

Discoglossidae Günther, 1858 (Amphibia, Anura): proposed conservation

Alain DUBOIS

Laboratoire des Reptiles et Amphibiens,
Muséum national d'Histoire naturelle,
25 rue Cuvier, 75005 Paris, France

The family-group name Discoglossidae Gunther, 1858 is shown to be a junior synonym of four other names : Bombinatorina Gray, 1825 ; Alytae Fitzinger, 1843 ; Bombitatores Fitzinger, 1843 : and Colodactyli Tschudi, 1845. The Article 40 of the *Code* allows to give the name Discoglossidae the date 1845 and priority over Colodactyli, but such an action cannot be taken as concerns the three other names. The ICZN is therefore requested to use its plenary powers to rule that the name Discoglossidae is to be given precedence over these three names whenever these names are considered to apply to a single taxon.

Note — This paper was submitted on 24 September 1982 to the Secretary of the International Commission on Zoological Nomenclature for publication in the *Bulletin of zoological Nomenclature*, but, despite repeated requests since then, has still not been published in this journal. The problem it raised has therefore remained unresolved, which is unfortunate, especially when one considers that, since then, several papers discussing the phylogeny, classification and nomenclature of the Discoglossidae, as well as books and checklists mentioning this and other family-group names, have been published (DUBOIS, 1983, 1984, 1985, 1987 a ; MAXSON & SZYMURA, 1984 , SANCHIZ, 1984 ; ALCOVER, SANDERS & SANCHIZ, 1984 , FROST, 1985 , DUELLMAN & TRUEB, 1986 ; LAURENT, 1986), and others are in progress. On 6 May 1986, the editor of the *Bulletin of zoological Nomenclature* at last proposed me to publish this paper, but in a drastically reduced version, excluding in particular the list of references, which would simply have been mentioned as being "held by the Secretariat". Unfortunately, a list of references held by a Secretariat cannot compare with a published list of references, which is immediately available to the whole scientific community, and will remain so in the future. The paper is therefore published here as it was submitted, except that a few more recent bibliographic references and information have been incorporated.

(1) The family-group name Discoglossidae was coined by GÜNTHER (1858 : 346 ; 1859) for a family including six nominal genera of Amphibia Anura (*Chiroleptes, Pelodytes, Discoglossus, Leptobrachium, Megalophrys* and *Ceratophryne*).

In the same works, GÜNTHER (1858, 1859) also recognized a family Bombinatoridae, with four genera (*Pelobates, Bombinator, Alsodes* and *Telmatobius*), and a family Alytidae, with three genera (*Alytes, Scaphiopus* and *Heleioporus*).

(2) COPE (1864, 1865) proposed a new classification of the Anura, in which he grouped in a single family the genera *Latonia, Discoglossus, Alytes, Bombinator* and later (1866) *Zaphrissa*. For this family he chose to use the name Discoglossidae.

Source MNHN, Paris

In making this choice, COPE (1864) would have taken a "first reviser action" if the three family-group names mentioned above had been created in the same paper by GÜNTHER (1858). Unfortunately, this is not the case.

Indeed, at the time when COPE took this action, his choice was particularly ill-founded. He should have used the name Bombinatoridae for this family : this name had the priority, having been coined, under the spelling Bombinatorina, by GRAY (1825) ; furthermore this name had been used regularly by zoologists since its creation and remained in use at least until 1885 (see references in Appendix)

The second and third family-group names available for the family were those of Alytae and of Bombitatores, both coined by FITZINGER (1843 : 32). The first one, based on the generic name *Alytes* Wagler, 1829, had been used by several authors since its creation (see Appendix). The second one, based on the generic name *Bombitator* Wagler, 1830, an unjustified emendation and hence substitute name for *Bombinator* Merrem, 1820 (see DUBOIS, 1984), had been used only once, and by its author (FITZINGER, 1860 : 415) after its creation. No first reviser action having ever been taken concerning the relative priority of the names Alytae and Bombitatores, I hereby select Alytae and consider it to have priority over Bombitatores.

The fourth available name for this group is Colodactyli, coined by TSCHUDI (1845) on the basis of the generic name *Colodactylus* Tschudi, 1845, a junior subjective synonym of *Discoglossus* Otth, 1837 (see DUBOIS, 1987 : 11).

The name Discoglossidae was only the fifth to have been coined, and had been used only by GÜNTHER (1858, 1859) when COPE's (1864) work was published.

(3) Although COPE's choice was not justified at the time when he made it, it was followed by most subsequent authors. This was the case in particular of BOULENGER (1882 444), who recognized a family Discoglossidae, including the genera *Discoglossus*, *Bombinator*, *Liopelma* and *Alytes*. Since then the name Discoglossidae has been almost universally used by zoologists (see Appendix) and is now considered the valid name of a family including several fossil general and four living genera of Anura *Alytes* Wagler, 1829 ; *Barbourula* Taylor & Noble, 1924 ; *Bombina* Oken, 1816 (Name Number 1064 on the *Official List of Generic Names in Zoology*) (a name of which *Bombinator* Merrem, 1820, and *Bombitator* Wagler, 1830, a substitute name for the latter, are junior subjective synonyms) ; and *Discoglossus* Otth, 1837 (a name of which *Colodactylus* Tschudi, 1845 is a junior subjective synonym)

Furthermore, this name has also been used, under the spelling Discoglossoidea, for a superfamily including the Discoglossidae and the Leiopelmatidae, by several recent authors (DUELLMAN, 1975 , DOWLING & DUELLMAN, 1978 , CEI, 1980 , LAURENT, 1980, 1986 ; DUBOIS, 1983, 1984, 1985 ; MAXSON & SZYMURA, 1984).

(4) In view of the almost universal use of the name Discoglossidae since 1882, conservation of this name and rejection of the names Bombinatoridae, Alytidae, Bombitatoridae and Colodactylidae is to be commanded.

As concerns the last of these four names, this action may be taken easily and by a simple recourse to Article 40 of the *Code* ANONYMOUS, 1985 : the generic name *Colodactylus* having been rejected as a junior synonym of *Discoglossus*, the family-group name Colodactyli having been replaced by Discoglossidae before 1961, and the replacement having won general ac-

Source MNHN, Paris

ceptance, this replacement is to be maintained. The name Discoglossidae retains its own author (GÜNTHER) but takes the precedence of Colodactyli of which it is to be deemed the senior synonym : it must therefore be now written Discoglossidae Gunther, 1858 (1845) (see DUBOIS, 1987 a).

As concerns the three other names (Bombinatoridae, Alytidae and Bombitatoridae) however, simple recourse to the *Code* does not allow to reject them, and appeal must be made to the ICZN to solve the problem. Two different actions could be contemplated to achieve this aim :

– the first one would to the suppression under the plenary powers of the names Bombinatorina Gray, 1825, Alytae Fitzinger, 1843 and of all other family-group names based on the generic names *Bombinator, Alytes* and *Bombitator* proposed before 1858 (see Appendix);

– the second one would be a Ruling under the plenary powers stating that the name Discoglossidae Gunther, 1858 (1845) should be given precedence over the name(s) Bombinatorina Gray, 1825, Alytae Fitzinger, 1843 and/or Bombitatores Fitzinger, 1843 by any zoologist who considers that the genera *Discoglossus* and *Bombina* and/or *Alytes* belong to the same family-group.

The second action is here advocated because it is more economical and also for additional reasons which will now be discussed.

(5) Recently, LANZA, CEI & CRESPO (1975, 1976) presented evidence for a rather large immunological distance between the genus *Discoglossus* on one side and the genera *Alytes* and *Bombina* on the other, and suggested that both groups could be considered as two distinct families.

For the new family which they proposed to recognize, LANZA, CEI & CRESPO (1975, 1976) used the name Bombinidae, which they credited to FITZINGER (1826). In fact, the name used by FITZINGER (1826) was Bombinatoroidea, a junior synonym of Bombinatorina Gray, 1825. This family-group name is based on the generic name *Bombinator* Merrem, 1820, which is a junior subjective synonym of *Bombina* Oken, 1816 and has therefore a separate status in nomenclature. The name Bombinatorina (or Bombinatoroidea) may therefore be emended into Bombinatoridae or Bombinatorinae, but not into Bombinidae or Bombininae.

The first family-group name based on the generic name *Bombina* Oken, 1816 is Bombininae Fejérváry, 1921. The existence of this name seems to have been ignored by most authors after its creation. Thus MERTENS (1955 : 132), in his application for the conservation of the generic name *Bombina*, wrote : "The genus *Bombina* Oken, 1816, is not the type genus of a taxon belonging to any family-group". After its creation, the name Bombininae (under this spelling or under the emendation Bombinidae) has been used by TATARINOV (1964), KUHN (1965, 1967) and LANZA, CEI & CRESPO (1975, 1976). I have been unable to trace other uses of this name.

(6) Subsequent authors did not follow LANZA, CEI & CRESPO's (1975, 1976) proposal to recognize two families instead of one, but some authors proposed to divide the family Discoglossidae in two subgroups.

When this application was submitted to the ICZN (24 September 1982), this use of subfamilial suprageneric groups had not started. Since then, while some authors (e.g. OLMO et al., 1982 ; MAXSON & SZYMURA, 1984 ; FROST, 1985 ; DUELLMAN & TRUEB, 1986 ; LAU-

Source MNHN, Paris

RENT, 1986) maintained all the genera of this group in a single undivided family, other authors proposed to divide the family in two subgroups. These subgroups were given the rank of "generic groups" ("*Discoglossus* group" and "*Bombina* group": ESTES & SANCHIZ, 1982 a, 1982 b), of tribes (Discoglossini and Alytini : SANCHIZ, 1984 ; ALCOVER, SANDERS & SANCHIZ, 1984) or of subfamilies (Discoglossinae and Bombinatorinae : DUBOIS, 1983, 1984, 1985, 1987 a).

Since it is likely that this use of subfamilial suprageneric groups in the Discoglossidae will be continued, it is important and urgent to stabilize the nomenclature of these groups and to solve the problems detailed above.

(7) If the family Discoglossidae is to be divided in two subfamilies, which name should be given to the non-nominotypical one?

In view of the recency of the name Bombininae and of its very scarce use since its creation (which is far from being a "general acceptance", in the sense e.g. of Art. 40), conservation of this name in place of its senior subjective synonym Bombinatorina is not justified, all the more that this latter name has had a period of rather large use in the nineteenth century (see Appendix). Furthermore, if the name Bombinatorina was to be suppressed, the second name available for a family-group including *Alytes* and *Bombina* would be Alytae Fitzinger, 1843, a name which has priority over Bombininae Fejérváry, 1921 and which has been used more in the past than this latter name (see Appendix). Finally, a third senior synonym of Bombininae is Bombitatores Fitzinger, 1843, so that conservation of the name Bombininae would request the suppression of three family-group names by the Commission.

The simplest and best action appears to be the conservation of the name Bombinatorina. This name has priority on the other ones, and was used more, and longer, than them, in the XIX century (see Appendix). The fact that this family-group name is based on a genus-group name which is now considered a junior synonym of another name is not a valid reason for rejecting this name, if one admits that family-group names of taxa are to be regulated by the *Code* (Art. 1 of the *Code*, ANONYMOUS, 1985) and in particular by its Principle of Priority (Art. 23 of the *Code*) (for a more detailed discussion of this question, see DUBOIS, 1987 b).

The simplest action which can be suggested for solving all the problems discussed above is therefore to provide for the priority of the name Discoglossidae over the name Bombinatorina, but without suppressing any name. The authors who believe that only one family-group taxon should be recognized for all these genera will therefore keep using the name Discoglossidae for this taxon, while those who think that *Alytes*, *Bombina* and *Barbourula* should be separated from *Discoglossus* at the subfamilial or familial level can use the name Bombinatorinae in this respect. Finally, for those who may think that even more splitting is necessary, they could have for example a family Discoglossidae Gunther, 1858 (1845) with two subfamilies, Discoglossinae Günther, 1858 (1845) and Bombinatorinae Gray, 1825, the latter with two tribes, Bombinatorini Gray, 1825 and Alytini Fitzinger, 1843 (see DUBOIS, 1987 a : 11-12).

(8) Accordingly I ask the International Commission on Zoological Nomenclature :

(1) to use its plenary powers to rule that the family-group name Discoglossidae Gunther, 1858 (1845) is to be given precedence over the name(s) Bombinatorina Gray, 1825, Alytae Fitzinger, 1843 and/or Bombitatores Fitzinger, 1843 by any zoologist who considers

Source MNHN, Paris

that the genera *Discoglossus* Otth, 1837 and *Bombina* Oken, 1816 and/or *Alytes* Wagler, 1829 belong to the same family-group;

(2) to place the following family-group names on the *Official List of Family-Group Names in Zoology*:

(a) Discoglossidae Gunther, 1858 (1845) (type genus *Discoglossus* Otth, 1837), with an endorsement that it is to be given nomenclatural precedence over Bombinatorina Gray, 1825, Alytae Fitzinger, 1843 and/or Bombitatores Fitzinger, 1843 whenever these names are considered synonyms;

(b) Bombinatorina Gray, 1825 (type genus *Bombinator* Merrem, 1820, a junior subjective synonym of *Bombina* Oken, 1816, Name Number 1064 on the *Official List of Generic Names in Zoology*), with an endorsement that it is not to be given priority over Discoglossidae Gunther, 1858 (1845) whenever the two names are considered synonyms;

(c) Alytae Fitzinger, 1843 (type genus *Alytes* Wagler, 1829), with an endorsement that it is not to be given priority over Discoglossidae Gunther, 1858 (1845) whenever the two names are considered synonyms;

(d) Bombitatores Fitzinger, 1843 (type genus *Bombitator* Wagler, 1830, a substitute name for *Bombinator* Merrem, 1820), with an endorsement that it is not to be given priority over Discoglossidae Gunther, 1858 (1845) whenever the two names are considered synonyms;

(3) to place the following generic names on the *Official List of Generic Names in Zoology*:

(a) *Discoglossus* Otth, 1837 (gender : masculine) (type species, by monotypy, *Discoglossus pictus* Otth, 1837);

(b) *Bombinator* Merrem, 1820 (gender : masculine) (type species, by subsequent designation of DUMÉRIL & BIBRON (1841 : 485), *Bufo igneus* Laurenti, 1768, a junior subjective synonym of *Rana bombina* Linnaeus, 1761, Name Number 1141 on the *Official List of Specific Names in Zoology*);

(c) *Alytes* Wagler, 1829 (gender : masculine) (type species, by monotypy, *Bufo obstetricans* Laurenti, 1768);

(d) *Bombitator* Wagler, 1830, a substitute name for *Bombinator* Merrem, 1820;

(4) to place the following specific names on the *Official List of Specific Names in Zoology*:

(a) *pictus* Otth, 1937, as published in the binomen *Discoglossus pictus* (specific name of type species of *Discoglossus* Otth, 1837);

(b) *igneus* Laurenti, 1768, as published in the binomen *Bufo igneus* (specific name of type species of *Bombinator* Merrem, 1820 and of *Bombitator* Wagler, 1830);

(c) *obstetricans* Laurenti, 1768, as published in the binomen *Bufo obstetricans* (specific name of type species of *Alytes* Wagler, 1829).

Source MNHN, Paris

RÉSUMÉ

Le nom Discoglossidae Gunther, 1858 s'avère un synonyme plus récent de quatre autres noms du groupe-famille : Bombinatorina Gray, 1825 ; Alytae Fitzinger, 1843 ; Bombitatores Fitzinger, 1843 , et Colodactyli Tschudi, 1845. L'article 40 du *Code* permet d'attribuer au nom Discoglossidae la date de 1845 et de lui donner la priorité sur Colodactyli, mais une telle action ne peut être effectuée en ce qui concerne les trois autres noms En conséquence, il est demandé à l'ICZN de faire usage de ses pleins pouvoirs pour décider que la priorité doit être donnée au nom Discoglossidae par rapport aux trois autres noms, lorsque ces noms sont considérés comme synonymes.

APPENDIX

List of references of works using the family-group names Bombinatorina Gray, 1825, Alytae Fitzinger, 1843, Bombitatores Fitzinger, 1843, Colodactyli Tschudi, 1845, Discoglossidae Gunther, 1858 and Bombininae Fejérváry, 1921.

Family-group original name, author and date (name of type genus)	Spelling used	References
Bombinatorina Gray, 1825 (*Bombinator* Merrem, 1820)	Bombinatorina	GRAY, 1825 : 214 BONAPARTE, 1850 BONAPARTE, 1852 : 477 GÜNTHER, 1858 : 344 GÜNTHER, 1859 : viii, 40 MIVART, 1869 . 290
	Bombinatoroidea	FITZINGER, 1826 : 37
	Bombinatoridae	GRAY, 1831 : 38 BONAPARTE, 1850 BONAPARTE, 1852 : 477 GÜNTHER, 1858 : 343 GÜNTHER, 1859 : viii, 40 STEINDACHNER, 1867 : 33 MIVART, 1869 : 286 FATIO, 1872 : 230 HOFFMANN, 1878 : 633 MÜLLER, 1878 : 582
	Bombinatores	TSCHUDI, 1838 : 26 TSCHUDI, 1845 : 170
	Bombinatorida	BAYER, 1885 : 22
	Bombinatorinae	DUBOIS, 1983 : 271 DUBOIS, 1984 : 26 DUBOIS, 1985 : 74 DUBOIS, 1987 a : 12
	Bombinatorini	DUBOIS, 1987 a : 12

Source MNHN, Paris

Family-group original name, author and date (name of type genus)	Spelling used	References
Alytae Fitzinger, 1843 (*Alytes* Wagler, 1829)	Alytae	FITZINGER, 1843 : 32 TSCHUDI, 1845 : 168 FITZINGER, 1860 : 415
	Alytina	BONAPARTE, 1850 BONAPARTE, 1852 : 477 MIVART, 1869 : 291
	Alytidae	GÜNTHER, 1858 : 346 GÜNTHER, 1859 : viii, 37 COPE, 1863 : 51 STEINDACHNER, 1867 : 32 KEFERSTEIN, 1868 : 269 MIVART, 1869 : 286 FATIO, 1872 : 230 HOFFMANN, 1878 : 631 LATASTE, 1878 : 491 MÜLLER, 1878 : 582 LATASTE, 1879 : 761 FROST, 1985 : 105
	Alytini	SANCHIZ, 1984 : 61 ALCOVER, SANDERS & SANCHIZ, 1984 : 109 DUBOIS, 1987 a : 12
	Alytinae	DUBOIS, 1987 a : 12
Bombitatores Fitzinger, 1843 (*Bombitator* Wagler, 1830)	Bombitatores	FITZINGER, 1843 : 32 FITZINGER, 1860 : 415
Colodactyli Tschudi, 1845 (*Colodactylus* Tschudi, 1845)	Colodactyli	TSCHUDI, 1845 : 167 DUBOIS, 1987 a : 11
	Colodactylidae	DUBOIS, 1987 a : 11
Discoglossidae Gunther, 1858 (*Discoglossus* Otth, 1837)	Discoglossidae	GÜNTHER, 1858 : 346 GÜNTHER, 1859 : viii, 34 COPE, 1864 : 183 COPE, 1865 : 105 COPE, 1866 : 74 STEINDACHNER, 1867 : 28 KEFERSTEIN, 1868 : 267 THEOBALD, 1868 : 82 MIVART, 1869 : 287 FATIO, 1872 : 230 COPE, 1875 : 10 HOFFMANN, 1878 : 627 LATASTE, 1878 : 491 MÜLLER, 1878 : 582 LATASTE, 1879 : 761 BOULENGER, 1882 : 444 CAMERANO, 1884 : 203

Source MNHN, Paris

Family-group original name, author and date (name of type genus)	Spelling used	References
		COPE, 1889 a : 248
		COPE, 1889 b : 862
		BOULENGER, 1897 : 123
		GADOW, 1901 . 152
		STEJNEGER, 1907 : 50
		BOULENGER, 1910 : 149
		SCHREIBER, 1912 : 159
		VAN DENBURGH, 1912 : 259
		NICHOLLS, 1916 : 81
		BOLKAY, 1919 : 349
		FEJÉRVÁRY, 1921 : 25
		NOBLE, 1922 . 22
		NIEDEN, 1923 : 24
		MIRANDA-RIBEIRO, 1924 : 143
		TAYLOR & NOBLE, 1924 : 1
		STEJNEGER, 1925 : 6
		NOBLE, 1927 : 69
		SCHMIDT, 1927 : 556
		MERTENS & MÜLLER, 1928 : 15
		NOBLE, 1931 . 486
		POPE, 1931 : 434
		LIU, 1935 : 22
		MERTENS & MÜLLER, 1940 : 14
		POPE & BORING, 1940 : 24
		BOURRET, 1942 : 153
		INGER, 1954 : 209
		REIG, 1958 : 115
		PASTEUR & BONS, 1959 : 100
		FUHN, 1960 : 164
		MERTENS & WERMUTH, 1960 : 37
		LIU & HU, 1961 : 35
		GOIN & GOIN, 1962 : 223
		GRIFFITHS, 1963 : 271
		TIHEN, 1965 : 315
		GORHAM, 1966 : 9
		OKADA, 1966 : 1
		INGER, 1967 : 371
		KAWAMURA, NISHIOKA & UEDA, 1972 : 303
		ESTES & REIG, 1973 : 17
		LYNCH, 1973 · 134
		SAVAGE, 1973 : 354
		STARRETT, 1973 : 251
		TRUEB, 1973 : 70
		GORHAM, 1974 : 41
		DUELLMAN, 1975 5
		LANZA, CEI & CRESPO, 1975 : 158
		LANZA, CEI & CRESPO, 1976 : 311
		SOKOL, 1977 : 505
		DOWLING & DUELLMAN, 1978 : 21.1
		GOIN, GOIN & ZUG, 1978 : 231
		ISKANDAR, 1978 : 564
		SANCHIZ & ADROVER, 1979 : 6

Source MNHN, Paris

Family-group original name, author and date (name of type genus)	Spelling used	References
		LAURENT, 1980 : 399 ESTES & SANCHIZ, 1982 a : 9 ESTES & SANCHIZ, 1982 b : 33 OLMO et al , 1982 : 283 DUBOIS, 1983 : 271 DUBOIS, 1984 : 24 MAXSON & SZYMURA, 1984 : 245 VIERTEL, 1984 : 21 SANCHIZ, 1984 : 61 ALCOVER, SANDERS & SANCHIZ, 1984 : 109 DUBOIS, 1985 : 74 FROST, 1985 : 105 DUELLMAN & TRUEB, 1986 : 518 LAURENT, 1986 : 661 DUBOIS, 1987 a : 11
	Discoglossina	MIVART, 1869 : 294
	Discoglossinae	FEJÉRVÁRY, 1921 : 25 DUBOIS, 1983 : 271 DUBOIS, 1984 : 26 DUBOIS, 1985 : 74 DUBOIS, 1987 a : 12
	Discoglossoidea	DUELLMAN, 1975 : 5 DOWLING & DUELLMAN, 1978 : 19.1 CEI, 1980 : 11 LAURENT, 1980 : 398 DUBOIS, 1983 : 271 DUBOIS, 1984 : 24 MAXSON & SZYMURA, 1984 : 245 DUBOIS, 1985 . 74 LAURENT, 1986 : 658
Bombininae Fejérváry, 1921 (*Bombina* Oken, 1816)	Bombininae	FEJÉRVÁRY, 1921 : 25 KUHN, 1967 : 16
	Bombinidae	TATARINOV, 1964 : 128 KUHN, 1965 : 89 KUHN, 1967 : 16 LANZA, CEI & CRESPO, 1975 : 158 LANZA, CEI & CRESPO, 1976 : 311

LITERATURE CITED

ALCOVER, J. A., SANDERS, E & SANCHIZ, B , 1984. – El registro fósil de los sapos parteros (Anura, Discoglossidae) de Baleares. *In* : HEMMER & ALCOVER (1984) : 109-121

BAYER, F , 1885. – O kostře žab z čeledi pelobatid. *Abh bohm. Ges. Wiss.*, (6,, **12** (13) : 1-24, pl 1-2.

Source MNHN, Paris

BOLKAY, S J , 1919. – Osnove Uporedne Osteologije Anurskih Batrahija. *Glasn zemalj Muz. Bosni Herceg.*, **31** : 275-357.

BONAPARTE, C. L., 1850. – *Conspectus systematum Herpetologiae et Amphibiologiae*. Editio altera reformata. Lugduni Batavorum, Brill : 1 pl.

----- 1852. - Conspectus systematum Herpetologiae et Amphibiologiae. *Nuovi Ann. Sci nat Bologna*, (3), **5** : 477 - 480.

BOULENGER, G. A., 1882. – *Catalogue of the Batrachia Salientia s. Ecaudata in the collection of the British Museum*. London, Taylor & Francis : i-xvi + 1-503, pl. I-XXX.

----- 1897. – *The Tailless Batrachians of Europe*. Part I London, Ray Society : i-iii + 1-210, pl. I-X, 2 maps.

----- 1910. – *Les Batraciens, et principalement ceux d'Europe*. Paris, Doin : i-iii + 1-305.

BOURRET, R., 1942 – *Les Batrachiens de l'Indochine* Hanoi, Institut océanographique de l'Indochine · i-x + 1-547, 4 pl.

CAMERANO, L., 1884. – Monografia degli Anfibi Anuri italiani. *Mem. real Accad. Sci Torino*, (2), **35** · 187-284, pl. I-II.

CEI, J. M., 1980. – Amphibians of Argentina. *Monit zool ital* , (n s.), monogr. **2**: i-xii + 1-609, pl 1-16 + 1-24.

COPE, E. D., 1863. – On *Trachycephalus*, *Scaphiopus* and other American Batrachia. *Proc Acad nat. Sci. Phila.*, **1863** : 43-54.

----- 1864 – On the limits and relations of the Raniformes. *Proc. Acad nat. Sci Phila.*, **1864** · 181-183.

----- 1865. – Sketch of the primary groups of Batrachia Salientia. *Nat. Hist Rev* , (n.s.), **5** . 97-120

----- 1866 – On the structures and distribution of the genera of the Arciferous Anura. *J Acad nat. Sci. Phila.*, (2), **6** : 67-112

----- 1875. – Check-list of North American Batrachia and Reptilia. *Bull. U S nat. Mus.*, **1** : 1-104.

----- 1889 a – The Batrachia of North America. *Bull. U. S. nat Mus.*, **34** : 1-525, pl I-LXXXVI.

----- 1889 b. – Synopsis of the families of Vertebrata. *Am. Nat.*, **23** : 849-877.

DOWLING, H. G. & DUELLMAN, W. E., 1978. – Systematic herpetology · a synopsis of families and higher categories *Publications in Herpetology*, Hiss Publications, New York, **7** · i-vii + 1.1-118.3 + i-viii.

DUBOIS, A , 1983. – Classification et nomenclature supragenérique des Amphibiens Anoures. *Bull. Soc. linn. Lyon*, **52** : 270-276.

----- 1984. – La nomenclature supragénérique des Amphibiens Anoures. *Mem. Mus nat. Hist. nat.*, (A), **131** : 1-64.

----- 1985. – Miscellanea nomenclatorica batrachologica (VII). *Alytes*, **4** : 61-78

----- 1987 a. – Miscellanea taxinomica batrachologica (I). *Alytes*, **5** : 7-95.

----- 1987 b. – Again on the nomenclature of frogs. *Alytes*, **6** : 27-55.

DUELLMAN, W E , 1975 – On the classification of frogs. *Occ Pap. Mus. nat. Hist. Univ. Kansas*, **42** : 1-14.

DUELLMAN, W. E. & TRUEB, L., 1986. – *Biology of Amphibians*. New York, McGraw-Hill : i-xix + 1-670

DUMÉRIL, A.-M.-C. & BIBRON, G., 1841 – *Erpetologie générale ou histoire naturelle complète des Reptiles*. Tome 8. Paris, Roret : i-vii + 1-792.

ESTES, R & REIG, O. A., 1973. – The early fossil record of frogs : a review of the evidence. *In*: VIAL (1973) : 11-63

ESTES, R. & SANCHIZ, B., 1982 a. – New discoglossid and palaeobatrachid frogs from the late Cretaceous of Wyoming and Montana, and a review of other frogs from the Lance and Hell Creek formations. *J. Vert. Paleont* , **2** : 9-20.

----- 1982b. – Early Cretaceous lower Vertebrates from Galve (Teruel), Spain *J. Vert Paleont* , **2** : 21-39.

FATIO, V., 1872. – *Faune des Vertebres de la Suisse*. Genève & Bâle, Georg . 1-603 + i-xii, pl I-V

FEJÉRVÁRY, G. J. V., 1921. – Kritische Bemerkungen zur Osteologie, Phylogenie und Systematik der Anuren. *Arch. Naturgesch.*, **87** (3) : 1-30

FITZINGER, L. I., 1826. – *Neue Classification der Reptilien*. Wien, Heubner : i-viii + 1-66, 1 tab.

----- 1843. – *Systema Reptilium*. Fasciculus primus. *Amblyglossae*. Vindobonae, Braumuller & Seidel : 1-106 + i-ix.

Source MNHN, Paris

----- 1860. – Die Ausbeute der österreichischen Naturforscher an Säugethieren und Reptilien während der Weltumsegelung Sr. Majestät Fregatte Novara. *Sber. Akad. Wiss Wien*, **42** : 383-416

FROST, D. R. (ed.), 1985. – *Amphibian species of the world* Lawrence, Allen Press & Assoc. Syst. Coll.: [i-iv] + i-v + 1-732.

FUHN, I. E., 1960 – Amphibia *Fauna Republicii Populare Romîne*, Bucureşti, Academiei Republicii Populare Romîne, **14** (1) : 1-288.

GADOW, H., 1901. – *Amphibia and Reptiles*. London, Macmillan & Co : i-xiii + 1-668, 1 pl.

GOIN, C. J. & GOIN, O.B., 1962. *Introduction to herpetology*. San Francisco & London, Freeman & Co : i-ix + 1-341.

GOIN, C. J., GOIN, O. B. & ZUG, G R , 1978 – *Introduction to herpetology*. Third edition. San Francisco, Freeman & Co. : i-xiii + 1-378.

GORHAM, S. W., 1966. – Liste der rezenten Amphibien und Reptilien. Ascaphidae, Leiopelmatidea (sic), Pipidae, Discoglossidae, Pelobatidae, Leptodactylidae, Rhinophrynidae *Das Tierreich*, **85** . i-xvi + 1-222.

----- 1974 – *Checklist of world Amphibians up to January 1, 1970* Saint John, The New Brunswick Museum : 1-173.

GRAY, J E , 1825 – A synopsis of the genera of Reptiles and Amphibia, with a description of some new species. *Ann. Philos.*, (2), **10** : 193-217.

----- 1831. – Description of two new genera of frogs discovered by John Reeves, Esq. in China. *In* : *The zoological Miscellany*, London, Treuttel, Wurz & Co., 1-40 : 38.

GRIFFITHS, I., 1963. – The phylogeny of the Salientia. *Biol Rev* , **38** : 241-292.

GÜNTHER, A., 1858. – On the systematic arrangement of the Tailless Batrachians and the structure of *Rhinophrynus dorsalis*. *Proc. zool. Soc. Lond.*, **1858** : 339-352.

--- 1859 – *Catalogue of the Batrachia Salientia in the collection of the British Museum*. London, Taylor & Francis : i-xvi + 1-160, pl. I-XII.

HEMMER, H. & ALCOVER, J. A. (eds.), 1984. – Història biològica del ferreret. Ciutat de Mallorca, Moll : 1-252.

HOFFMANN, C K., 1878. – Klassen und Ordnungen der Amphibien wissenschaftlich dargestelldt in Wort und Bild *In*: BRONN, H. G., *Die Klassen und Ordnungen des Thier-Reichs wissenschaftlich dargestelldt in Wort und Bild*, Leipzig & Heidelberg, Winter, **6** (2) : 1-726, pl I-LII

INGER, R. F., 1954. – Systematics and zoogeography of Philippine Amphibia. *Fieldiana . Zool* , **33** : 183 531.

----- 1967. – The development of a phylogeny of frogs. *Evolution*, **21** : 369-384.

ISKANDAR, D. J., 1978. – A new species of *Barbourula*: first record of a discoglossid Anuran in Borneo. *Copeia*, **1978** : 564-566.

KAWAMURA, T , NISHIOKA, M. & UEDA, H., 1972 - Reproduction of the oriental fire-bellied toad, *Bombina orientalis*, with special reference to the superiority of this species as a laboratory animal *Sci. Report Lab. amph Biol. Hiroshima Univ.*, **1** : 303-317

KEFERSTEIN, W , 1868. – Ueber die Batrachier Australiens *Arch Naturgesch.*, **34** (1) . 253-290, pl V-VIII.

KUHN, O., 1965 – *Die Amphibien. System und Stammesgeschichte* Krailling bei Munchen, Oeben . 1-102.

----- 1967. – *Amphibien und Reptilien*. Stuttgart, Gustav Fischer : i-vii + 1-124.

LANZA, B , CEI, J. M & CRESPO, E., 1975 – Immunological evidence for the specific status of *Discoglossus pictus* Otth, 1837 and *D sardus* Tschudi, 1837, with notes on the families Discoglossidae Günther, 1858 and Bombinidae Fitzinger, 1826 (Amphibia Salientia). *Monit zool. ital.*, (n.s.), **9** : 153-162.

----- 1976 – Further immunological evidence for the validity of the family Bombinidae (Amphibia Salientia). *Monit. zool. ital.*, (n s), **10** : 311-314.

LATASTE, F., 1878 – Division en familles naturelles des Batraciens Anoures d'Europe. *Rev int. Sci* , **2** : 488-499.

----- 1879. – Division en familles naturelles des Batraciens Anoures d'Europe. *C r Assoc fr. Av. Sci* , **7** : 758-765.

LAURENT, R. F., 1980. – Esquisse d'une phylogenese des Anoures. *Bull Soc zool France*, **104** : 397-422

--- 1986. – Sous-classe des Lissamphibiens (Lissamphibia). Systematique. *In* : P -P. GRASSÉ & M.

Source MNHN, Paris

DELSOL (eds.), *Traite de zoologie*, Tome XIV, *Batraciens*, Fasc. I-B, Paris, Masson · 594-797.

LAURENTI, J. N., 1768. – *Specimen medicum, exhibens Synopsin Reptilium emendatam cum experimentis circa venena et antidota reptilium austriacorum* Viennae, Joan. Thom. Nob de Trattnern : i-ii + 1-215, pl. I-V.

LINNAEUS, C , 1761 – *Fauna Svecica*. Editio altera, auctior. Stockholmiae, Laurentii Salvii . i-xlix + 1-579, pl. I-II

LIU, C. C., 1935. – Types of vocal sac in the Salientia *Proc Boston Soc. nat Hist* , **41** (3) · 19-40, pl. 4-8.

LIU, C.-C. & HU, S.-C., 1961. – *The Tailless Amphibians of China* (In Chinese). Shanghai : i-xvi + 1-364, pl. I-VI + I-XXVIII

LYNCH, J. D., 1973. – The transition from archaic to advanced frogs. *In*: VIAL (1973) : 133-182.

MAXSON, L R & SZYMURA, J M., 1984 – Relationships among discoglossid frogs : an albumin perspective. *Amphibia-Reptilia*, **5** : 245-252.

MERREM, B , 1820 – *Versuch eines Systems der Amphibien* Marburg, Johann Christian Krieger . 1-188 (× 2) + 189-191, 1 pl.

MERTENS, R., 1955. – Proposed use of the plenary powers to conserve the generic name *Bombina* Oken, 1816 (class Amphibia, order Anura). *Bull. zool. Nomencl* , **11** : 132-133.

MERTENS, R. & MÜLLER, L., 1928. – Liste der Amphibien und Reptilien Europas. *Abh. senckenberg naturf. Ges.*, **41** : 1-62

----- 1940. Die Amphibien und Reptilien Europas (Zweite Liste, nach dem Stand vom 1. Januar 1940). *Abh. senckenberg naturf. Ges* , **451** : 1-56.

MERTENS, R & WERMUTH, H., 1960. *Die Amphibien und Reptilien Europas*. (Dritte Liste, nach dem Stand vom 1. Januar 1960). Frankfurt am Main, Waldemar Kramer : i-xi + 1-264

MIRANDA RIBEIRO, A. DE, 1924. – Notas batrachologicas. *Bol Mus nac Rio de Janeiro*, **1** 137 143

MIVART, G., 1869. – On the classification of the Anurous Batrachians. *Proc. zool Soc Lond* , **1869** . 280-295.

MÜLLER, F., 1878. – Katalog der im Museum und Universitatskabinet zu Basel aufgestellten Amphibien und Reptilien nebst Anmerkungen *Verhandl. naturf Ges Basel*, **6** . 559-709, pl. I-III.

NICHOLLS, G E., 1916. – The structure of the vertebral column in the Anura Phaneroglossa and its importance as a basis of classification. *Proc. Linn. Soc Lond* , **128** : 80-92.

NIEDEN, F , 1923. – Amphibia Anura I. Subordo Aglossa und Phaneroglossa, sectio 1 Arcifera *Das Tierreich*, **46** : 1-584.

NOBLE, G. K , 1922. – The phylogeny of the Salientia I The osteology and the thigh musculature ; their bearing on classification and phylogeny. *Bull. Am. Mus. nat. Hist* , **46** : 1-87, pl I-XXIII, 1 tab.

----- 1927. – The value of life history data in the study of the evolution of the Amphibia *Annals New York Acad. Sci.*, **30** : 31-128, pl. I-IX.

----- 1931. – *The biology of the Amphibia*. New York, Dover . i-xviii + 1-577.

OKADA, Y , 1966. – *Fauna Japonica Anura (Amphibia)*. Tokyo, Biogeographical Society of Japan . i-xii + 1-234, pl. I-XXIV.

OKEN, L VON, 1816. – *Lehrbuch der Naturgeschichte* Dritter Theil, *Zoologie*, Zweite Abtheilung. Jena, August Schmid & Comp.· i-xvi + 1-1272.

OLMO, E., MORESCALCHI, A., STINGO, V. & ODIERNA, G , 1982 – Genome characteristics and the systematics of the Discoglossidae (Amphibia Salientia) *Monit zool ital* , (n.s.), **16** : 283-299

OTTH, A, 1837 – Beschreibung einer neuen Europaischen Froschgattung, *Discoglossus N. Denkschr Schweizer. Ges. Naturwiss.*, **1** (4) : 1-7, 1 pl.

PASTEUR, G. & BONS, J., 1959. – Les Batraciens du Maroc. *Trav Inst sci cherif.*, (Zool.), **17** · i-xvi + 1-246, pl. I-III, maps 1-3.

POPE, C H , 1931. – Notes on Amphibians from Fukien, Hainan, and other parts of China *Bull Am Mus. nat. Hist.*, **61** : 397-611, pl XIII-XXII.

POPE, C. H. & BORING, A. M., 1940. A survey of Chinese Amphibia. *Peking nat Hist. Bull.*, **15** : 13-86, 1 map.

REIG, O. A., 1958. – Proposiciones para une nueva macrosistematica de los Anuros. *Physis*, **21** . 109-118.

SANCHIZ, B., 1984. – Análisis filogenético de la tribu Alytini (Anura, Discoglossidae) mediante el estudio de su morfoestructura ósea. *In*: HEMMER & ALCOVER (1984) : 61-108.

Source MNHN, Paris

SANCHIZ, F. B. & ADROVER, R , 1979 – Anfibios fosiles del Pleistoceno de Mallorca. *Doñana, Acta vertebr.*, **4** : 5-25.

SAVAGE, J. M., 1973. – The geographic distribution of frogs : patterns and predictions. *In* . VIAL (1973) · 351-445.

SCHMIDT, K. P., 1927. – Notes on Chinese Amphibians. *Bull. Am Mus nat Hist* , **54** 553-575, pl. XXXI-XXXII.

SCHREIBER, E., 1912. – *Herpetologia Europaea.* Jena, Gustav Fischer . i-x + 1-960.

SOKOL, O. M., 1977. – A subordinal classification of frogs (Amphibia : Anura). *J. Zool., Lond.*, **182** : 505-508

STARRETT, P. H., 1973. – Evolutionary patterns in larval morphology. *In* · VIAL (1973) . 251-271.

STEINDACHNER, F , 1867. – *Reise der osterreichischen Fregatte Novara um die Erde in den Jahren 1857, 1858, 1859 unter den Befehlen des Commodore B von Wullerstorf-Urbair* Zoologischer Theil. Band I. *Amphibien* Wien, aus der Kaiserlich-Koniglichen Hof- und Staatsdruckerei : 1-70, pl. I-V

STEJNEGER, L., 1907. – Herpetology of Japan and adjacent territory. *Bull U S nat Mus.*, **58**: i-xx + 1-577, pl. I-XXXV.

----- 1925. – Chinese Amphibians and Reptiles in the United States National Museum. *Proc. U. S. nat. Mus* , **66** (25) : 1-115.

TATARINOV, L. P., 1964. – Nadotryad Salientia Prygayuščie, ili Beskhvostye. *In* : Y. A. ORLOV (ed), *Osnovy Paleontologii*, Tome 12, *Zemnovodnye, Presmykayuščiesya i Ptiсy*. Moskva, Izdatelbstvo "Nauka" : 125-133

TAYLOR, E. H. & NOBLE, G K , 1924. - A new genus of discoglossid frogs from the Philippine islands. *Am. Mus. Novit.*, **121** : 1-4

THEOBALD, W., 1868. - Catalogue of Reptiles in the Museum of the Asiatic Society of Bengal. *J asiat Soc. Bengal*, **1868** : i-iii + 1-88, 4 pl.

TIHEN, J. A., 1965. – Evolutionary trends in frogs. *Am. Zool.*, **5** : 309-318

TRUEB, L., 1973. – Bones, frogs, and evolution. *In* : VIAL (1973) : 65-132.

TSCHUDI, J. J., 1838 – *Classification der Batrachier, mit Berucksichtigung der fossilen Thiere dieser Abtheilung der Reptilien.* Neuchâtel, Petitpierre : 1-102, pl. I-VI.

----- 1845. – Reptilium conspectus quae in Republica Peruana reperiuntur et pleraque observata vel collecta sunt in itinere. *Arch Naturgesch.*, **11** : 150-170.

VAN DENBURGH, J., 1912. – Notes on *Ascaphus*, the discoglossoid toad of North America. *Proc. Calif. Acad. Sci.*, (4), **3** : 259-264.

VIAL, J. L. (ed.), 1973. – *Evolutionary biology of the Anurans.* Columbia, University of Missouri Press . i-xii + 1-470.

VIERTEL, B., 1984. – Habit, melanin pigmentation, oral disc, oral cavity and filter apparatus of the larvae of *Baleaphryne muletensis. In* : HEMMER & ALCOVER (1984) : 21-43.

WAGLER, J., 1829. – Descriptiones et icones Amphibiorum. *Isis von Oken*, **1829** · 68-70.

----- 1830 – *Natürliches System der Amphibien, mit vorangehender Classification der Saugethiere und Vogel.* Munchen, Stuttgart & Tubingen, Cotta : i-vi + 1-354.

Source MNHN, Paris

Strongylopus Tschudi, 1838 (Amphibia, Anura): request for the designation under the plenary powers of a type-species in agreement with current usage

Alain DUBOIS

Laboratoire des Reptiles et Amphibiens,
Muséum national d'Histoire naturelle,
25 rue Cuvier, 75005 Paris, France

A detailed analysis shows that, as a result of Opinion 713 (1964) of the International Commission on Zoological Nomenclature, the nominal genus *Strongylopus* Tschudi, 1838 does not have at present a type-species, and that the possible designations of type-species available under the Rules would result in nomenclatural problems. The ICZN is therefore asked to use its plenary powers to designate for this genus a type-species in agreement with current usage

Note. — This paper was submitted on 8 September 1980 to the Secretary of the International Commission on Zoological Nomenclature for publication in the *Bulletin of zoological Nomenclature*, but, despite repeated requests since then, has still not been published in this journal. The problem it raised has therefore remained unresolved, which is unfortunate, especially when one considers that, since then, several papers and checklists mentioning the generic name *Strongylopus* have been published (CLARKE, 1981 , DUBOIS, 1981 a, 1981 b, 1987 , FROST, 1985 ; DUELLMAN & TRUEB, 1986), and others are in progress This paper is therefore published here as it was submitted, except that a few more recent bibliographic references have been incorporated.

(1) After having long been considered a subjective synonym of the Amphibian generic name *Rana* Linnaeus, 1758, the name *Strongylopus* Tschudi, 1838 was resurrected as a valid generic name by VAN DIJK (1966). Since then it has been used as a valid generic (VAN DIJK, 1971, 1972 ; CHANNING & VAN DIJK, 1976 ; CHANNING, 1979 ; CLARKE, 1981 ; FROST, 1985 ; DUELLMAN & TRUEB, 1986) or subgeneric (DUBOIS, 1981 a, 1981 b, 1987) name by some authors, while others (PASSMORE & CARRUTHERS, 1979) still considered it as a synonym of *Rana*. It is likely that this name will remain in use, at least to designate a subgenus of the genus *Rana* s.l. However, evidence is below presented that the nominal genus *Strongylopus* Tschudi, 1838 does not at present have a type-species, and that the possible designations of type-species available under the Rules would result in nomenclatural problems. The Commission is therefore requested to use its plenary powers to designate a type-species for this nominal genus in agreement with current usage.

(2) The generic name *Strongylopus* was created by TSCHUDI (1838 : 38, 78-79) for a single nominal species, "*Rana fasciata* Boie". As was shown by PARKER & RIDE (1962), BOIE

Source MNHN, Paris

(1832 : 62) credited the name *Rana fasciata* to BURCHELL (1824 : 32). Therefore the type-species of *Strongylopus* at its creation was *Rana fasciata* Burchell, 1824 by monotypy.

(3) As a result of PARKER & RIDE's (1962) application and after the comments of SMITH (1963) and POYNTON (1963) about it, the Commission (Opinion 713 ; ANONYMOUS, 1964) decided to suppress the name *Rana fasciata* Burchell, 1824, as well as all other uses of the combination *Rana fasciata* prior to that by SMITH (1849), and to place the name *Rana fasciata* Smith, 1849 on the *Official List of Specific Names in Zoology*.

(4) It is clear that the generic name *Strongylopus*, coined in 1838, cannot have as its type-species by monotypy a nominal species created in 1849. Furthermore, TSCHUDI (1838) based his genus *Strongylopus* on specimens in the Leiden Museum which presumably belonged to the species *Rana grayi* Smith, 1849 and not to *Rana fasciata* Smith, 1849 (see PARKER & RIDE, 1962). In any case, both nominal species *Rana fasciata* and *Rana grayi* date from SMITH's (1849) paper, and cannot be the type-species of *Strongylopus* by original monotypy ; they cannot either be considered as originally included in this genus, at least not as from TSCHUDI's (1838) work. The genus *Strongylopus* is however available as of TSCHUDI (1838), since based on a diagnosis. The only nominal species originally included in this genus having been suppressed by the Opinion 713, the result is the same as if this genus had been created without any nominal species included. Therefore the first author to have associated available specific names to the name *Strongylopus* has fixed the originally included species of this genus

(5) DUMÉRIL & BIBRON (1841 : 389) mention the combination *Strongylopus fasciatus* in the synonymy of *Rana fasciata*. This work is still anterior to the work of SMITH (1849) and, following the Opinion 713, the name *Rana fasciata* is still not available at that time.

As was noted by PARKER & RIDE (1962), SMITH (1849) had relied upon DUMÉRIL & BIBRON's (1841) work to define the species *Rana fasciata*. He had restricted the use of this name to some of the specimens upon which DUMÉRIL & BIBRON had based their description of this species, and which were considered by them to constitute a particular variety, "Variété D", of this species.

While SMITH (1963) and HUBBS (in ANONYMOUS, 1964) are certainly correct in stating that a specific name, associated with a given species, should not be credited to an author to whom this given species was unknown, it may be regretted that, when voting on the Opinion 713 (see ANONYMOUS, 1964), the Commission was not proposed as a third alternative in the Part 2 of the vote to validate the name *Rana fasciata* as of DUMÉRIL & BIBRON (1841) and to designate for this nominal species, rather than a neotype, a lectotype, chosen among the still extant specimens on which DUMÉRIL & BIBRON (1841) had based their description of *Rana fasciata*. For this purpose, the specimen No. 396 in the Paris Museum collections, an adult female collected by DELALANDE in the Cape region, which belongs to DUMÉRIL & BIBRON's "Variété D" and which is a typical *Rana fasciata*, would have been available. If this had been done, *Rana fasciata* would be the type-species of *Strongylopus* by subsequent monotypy but, unless changes are brought to the Opinion 713, it cannot be the case.

(6) FITZINGER (1843 : 31) mentioned "*Strongyl. fasciatus* Tschud " as type-species of *Strongylopus*, and GÜNTHER (1859 : 20) quoted "*Strongylopus fasciatus*, Tschudi" in the synonymy of "*Rana fasciata*, Boie" Both these authors refer to a specific name, "*fasciatus* Tschudi" (= *fasciata* Burchell) which is not available as having been suppressed by the Opi-

Source MNHN, Paris

nion 713, and therefore cannot be construed as having designated a type-species for *Strongylopus* or as having included a nominal species in this genus.

(7) The first author to have associated available specific names to *Strongylopus* is FITZINGER (1860 : 414), who wrote :

"*Strongylopus Delalandii* Fitz. (Rana Delalandii Dum. Bibr.) Cap.
Strongylopus fasciatus Tschudi (Rana fasciata Boie. - Rana fasciata Dum. Bibr.) Cap.
Strongylopus oxyrhynchus Fitz. (Rana oxyrhynchus Sundevall) Cap."

The first of these three names, *Rana delalandii* Duméril & Bibron, 1841 (nec *Pyxicephalus delalandii* Tschudi, 1838), is a senior synonym of *Rana angolensis* Bocage, 1866 (see e.g. POYNTON, 1964 : 103), and applies to a species of the subgenus or genus *Rana* s. str. The third name, *Rana oxyrhynchus* Smith, 1849, applies to a species of the subgenus or genus *Ptychadena* Boulenger, 1917 (see e.g. POYNTON, 1964 : 124). As for the second name, it refers again to the suppressed name *Rana fasciata* Burchell, 1824 and is not available, all the more that SMITH's *Rana fasciata* is not even mentioned as a synonym.

Therefore two nominal species only, *Rana delalandii* Duméril & Bibron, 1841 and *Rana oxyrhynchus* Smith, 1849 are to be considered as the species originally included in the genus *Strongylopus* Tschudi, 1838, and are the only two species eligible for type-fixation in this genus. The fact that later STEINDACHNER (1867 : 21-22) mentioned the names *Rana grayi* Smith, 1849 (as a synonym of "*Strongylopus grayi* Steind.") and *Rana fasciata* Smith, 1849 (as a synonym of "*Strongylopus fasciatus* Tschudi") is of no relevance here, since STEINDACHNER's work is largely posterior to FITZINGER's.

(8) None of the two species originally included in *Strongylopus* belongs to the group to which this name is currently applied. If *Rana delalandii* Duméril & Bibron, 1841 was chosen as the type-species of *Strongylopus*, this name would disappear as a subjective junior synonym of *Rana* Linnaeus, 1758 (see e.g. DUBOIS, 1987 : 42): this would have no other inconvenience than the need of coining a new name for the group of frogs including *Rana fasciata* Smith, 1849 and *Rana grayi* Smith, 1849. If, on the other hand, *Rana oxyrhynchus* Smith, 1849 was chosen as the type-species of *Strongylopus*, this latter name should replace *Ptychadena* Boulenger, 1917 as the valid name of another subgenus or genus of African ranids. This latter consequence would be most disturbing for the stability of nomenclature since the name *Ptychadena* has been regularly used since its creation.

(9) In order to preserve the stability of nomenclature, an action of the Commission is necessary. Two possible actions may be contemplated.

The first one, which I strongly advocate, would be to revert to the Opinion 713 and to make the name *Rana fasciata* available as of DUMÉRIL & BIBRON (1841) ; the specimen No. 396 in the Paris Museum would be designated as lectotype of this species and the designation of a neotype for *Rana fasciata* made by PARKER & RIDE (1962) would be annulated ; following this action, the species *Rana fasciata* Duméril & Bibron, 1841 would automatically become the type-species of *Strongylopus* Tschudi, 1838 by subsequent monotypy.

If the Commission refused to change the wording of the Opinion 713, the action to take would be to suppress all previous designations of type-species for *Strongylopus* Tschudi, 1838, and to designate a type-species for this genus under the plenary powers. The choice

Source MNHN, Paris

of this type-species could again be a matter of discussion : one could advocate the choice of *Rana grayi* Smith, 1849, since this species, although under the name "*Rana fasciata* Boie", is likely to be the one on which TSCHUDI (1838) had based his genus *Strongylopus* ; or one could advocate the choice of *Rana fasciata* Smith, 1849, in order to follow previous designations (e.g. FITZINGER, 1843, POYNTON, 1964 and FROST, 1985 mentioned "*Rana fasciata*" as the type-species of *Strongylopus*). Since *Rana grayi* and *Rana fasciata* are very closely related species (see e.g. POYNTON, 1964 and PASSMORE & CARRUTHERS, 1979), any genus containing one of them is bound to contain also the other one, and both possible designations would be strictly equivalent in terms of generic content.

(10) Accordingly I ask the International Commission on Zoological Nomenclature to use its plenary powers to settle the matters in this question, by choosing between the three following alternatives :

(a) Alternative A.

(1) to use its plenary powers to change some parts of the Opinion 713 ; the following new wordings are to replace those which appear in the original Opinion under the same numbers :

(1) (b) all other uses of the specific name *fasciata*, in the combination *Rana fasciata*, prior to that by DUMÉRIL & BIBRON, 1841;

(2) (a) *fasciata* Duméril & Bibron, 1841, as published in the binomen *Rana fasciata*, as interpreted by the specimen No. 396, in the Paris Museum collections, which is hereby designated as lectotype of this species (Name No. 2042);

(3) (b) *fasciata*, all other uses of, in the combination *Rana fasciata* prior to that by DUMÉRIL & BIBRON, 1841 (as suppressed under the plenary powers in (1) (b) above) (Name No. 807);

(2) to change the wordings of the entry No. 2042 in the *Official List of Specific Names in Zoology* and of the entry No. 807 in the *Official Index of Rejected and Invalid Specific Names in Zoology* according to (1) above;

(3) to place the generic name *Strongylopus* Tschudi, 1838 (gender : masculine), type-species, by subsequent monotypy through DUMÉRIL & BIBRON (1841), *Rana fasciata* Duméril & Bibron, 1841, on the *Official List of Generic Names in Zoology*

(b) Alternative B.

(1) to use its plenary powers to suppress all previous fixations of type-species for *Strongylopus* Tschudi, 1838 and to designate *Rana grayi* Smith, 1849, as type-species of this genus;

(2) to place the generic name *Strongylopus* Tschudi, 1838 (gender : masculine), type-species, by designation above in (1), *Rana grayi* Smith, 1849, on the *Official List of Generic Names in Zoology*.

(c) Alternative C.

Same as Alternative B, but with *Rana fasciata* Smith, 1849 instead of *Rana grayi* Smith, 1849 designated as type-species of *Strongylopus* Tschudi, 1838.

Source MNHN, Paris

RÉSUMÉ

Une analyse détaillée permet de montrer que, par suite de l'Opinion 713 (1964) de la Commission Internationale de Nomenclature Zoologique, le genre nominal *Strongylopus* Tschudi, 1838 ne possède pas à présent d'espèce-type, et que les désignations d'espèce-type actuellement possibles en fonction du *Code* entraîneraient des problèmes nomenclaturaux. En conséquence il est demandé à l'ICZN de faire usage de ses pleins pouvoirs pour désigner pour ce genre une espèce-type qui soit en accord avec l'usage actuel.

LITERATURE CITED

ANONYMOUS, 1964. – Opinion 713. *Rana fasciata* Smith, 1849 (Amphibia): added to the official list with suppression of *Rana fasciata* Burchell, 1824, under the plenary powers *Bull. zool. Nom.*, **21** : 352-354.

BOIE, H., 1832 – *Briefe von Heinrich Boie ; geschrieben aus Ostindien und auf der Reise dahin* Schleswig, Koniglichen Taubstummen Institut : 1-154

BURCHELL, W J., 1824. – *Travels in the interior of Southern Africa.* Vol II. London, Longman & Co.: i-viii + 1-648, pl. 1-10.

CHANNING, A , 1979. – Ecological and systematic relationships of *Rana* and *Strongylopus* in Southern Natal (Amphibia : Anura). *Ann. Natal Mus* . **23** : 797-831

CHANNING, A. & VAN DIJK, D. E., 1976. – *A guide to the frogs of South West Africa.* Durban, University of Durban, Westville Press : 1-47.

CLARKE, B. T., 1981 – Comparative osteology and evolutionary relationships in the African Raninae (Anura Ranidae). *Monit. zool. ital.*, (n. s.), **15**, suppl. : 285-331.

DUBOIS, A., 1981 a. – Deux noms d'espèces préoccupés dans le genre *Rana* (Amphibiens, Anoures). *Bull. Mus. natn. Hist. nat.*, (4), **2** (A) : 927-931.

----- 1981 b – Liste des genres et sous-genres nominaux de Ranoidea (Amphibiens, Anoures) du monde, avec identification de leurs espèces-types · conséquences nomenclaturales. *Monit. zool. ital* , (n. s.), **15**, suppl. : 225-284.

----- 1987. – Miscellanea taxinomica batrachologica (I). *Alytes*, **5** : 7-95

DUELLMAN, W. E. & TRUEB, L., 1986 – *Biology of Amphibians.* New York, McGraw-Hill . i-xix + 1-670

DUMÉRIL, A.-M.-C. & BIBRON, G., 1841. – *Erpétologie generale ou histoire naturelle complète des Reptiles.* Tome 8 Paris, Librairie encyclopédique de Roret : i-vii + 1-792.

FITZINGER, L., 1843. – *Systema Reptilium* Fasciculus primus. *Amblyglossae.* Vindobonae, Braumuller & Seidel : 1-106 + i-ix.

----- 1860 – Die Ausbeute der österreichischen Naturforscher an Saugethieren und Reptilien wahrend der Weltumsegelung Sr Majestat Fregatte Novara. *Sitz -ber. kais. Akad. Wiss Wien*, **42** . 383-416.

FROST, D. R. (ed.), 1985. – *Amphibian species of the world.* Lawrence, Allen Press & Assoc. Syst Coll. · [i-iv] + i-v + 1-732.

GÜNTHER, A., 1859. – *Catalogue of the Batrachia Salientia in the collection of the British Museum.* London, Taylor & Francis : i-xvi + 1-160, pl. I-XII.

PARKER, H. W. & RIDE, W. D. L., 1962. – *Rana fasciata* Burchell, 1824 (Amphibia) , proposed designation of a neotype under the plenary powers. Z N (S) 1253 *Bull zool Nom.*, **19** . 290-292

PASSMORE, N. I. & CARRUTHERS, V C , 1979. – *South African frogs.* Johannesburg, Witwatersrand University Press : i-xviii + 1-270.

POYNTON, J. C , 1963 – Comment on the proposed use of the plenary powers to designate a neotype for *Rana fasciata* Burchell, 1824. Z.N.(S.) 1253. *Bull. zool Nom* , **20** : 255.

----- 1964. – The Amphibia of Southern Africa : a faunal study. *Ann. Natal Mus.*, **17** : 1-334

Source MNHN, Paris

SMITH, A., 1849. – *Illustrations of the Zoology of South Africa Reptilia.* London, Smith, Elder & Co · pl. 1-78, pp. 1-28 (Appendix).

SMITH, H. M., 1963 – Comment on the proposed use of the plenary powers to designate a neotype for *Rana fasciata* Burchell, 1824. Z.N.(S.) 1253. *Bull. zool. Nom.*, **20** : 254.

STEINDACHNER, F , 1867 – *Reise der osterreichischen Fregatte Novara um die Erde in den Jahren 1857, 1858, 1859 unter den Befehlen des Commodore B von Wullerstorf-Urbair. Zoologischer Theil.* Bd I. *Amphibien.* Wien, aus der Kaiserlich-Koniglichen Hof- und Staatsdruckerei . 1 70, pl I-V

TSCHUDI, J. J , 1838 – *Classification der Batrachier, mit Berücksichtigung der fossilen Thiere dieser Abtheilung der Reptilien.* Neuchâtel, Petitpierre : 1-102, pl. I-VI.

VAN DIJK, D. E., 1966. – Systematic and field keys to the families, genera and described species of Southern African Anuran tadpoles. *Ann. Natal Mus.*, **18** : 231-286.

----- 1971 – Anuran ecology in relation particularly to oviposition and development out of water *Zool afr.*, **6** : 119-132.

----- 1972 – The behaviour of Southern African Anuran tadpoles with particular reference to their ecology and related external morphological features. *Zool afr.*, **7** : 49-55.

Source MNHN, Paris

Elachistocleis Parker, 1927 (Amphibia, Anura) : proposed conservation

Alain DUBOIS

Laboratoire des Reptiles et Amphibiens,
Muséum national d'Histoire naturelle,
25 rue Cuvier, 75005 Paris, France

The overlooked fact that DUMÉRIL & BIBRON (1841) were the first authors to validly designate a type-species, namely *Rana ovalis* Schneider, 1799, for the nominal genus *Engystoma* Fitzinger, 1826, is stressed. *Engystoma* is therefore the valid name for the microhylid genus now universally known as *Elachistocleis* Parker, 1927. The nomenclatural consequences of this fact are discussed, both as concerns genus-group and family-group names, and the ICZN is requested to use its plenary powers to designate the nominal species *Rana gibbosa* Linnaeus, 1758 as type-species of *Engystoma* in order to solve these problems.

Note. — This paper was submitted on 15 October 1982 to the Secretary of the International Commission on Zoological Nomenclature for publication in the *Bulletin of zoological Nomenclature*, but, despite repeated requests since then, has still not been published in this journal. The problems is raised have therefore remained unresolved, which is unfortunate, especially when one considers that, since then, several publications mentioning the names discussed below have appeared, including three checklists (HARDING, 1983 ; DUBOIS, 1984 ; FROST, 1985) and two important monographs (DUELLMAN & TRUEB, 1986 ; LAURENT, 1986), and others are in progress. This paper is therefore published here as it was submitted, except that a few recent bibliographic references have been incorporated, as well as an additional discussion made necessary by the changes introduced in Art 32 and 35 of the new *Code*

(1) MERREM (1820 : 177) created the Amphibian genus *Breviceps* for the single nominal species *Rana gibbosa* Linnaeus, 1758, which is therefore the type-species of this genus by monotypy. This genus, which now includes more than ten species of African frogs, is now a member of the Brevicipitinae subfamily of the family Microhylidae.

(2) FITZINGER (1826 : 40) created the genus *Engystoma*. He mentioned the species *Rana gibbosa* Linnaeus, 1758 as a "Repräsentant" (an example) of his new genus, but did not clearly, formally, designate this species as type of his new genus. Beside this "Reprasentant" he also mentioned other nominal species as being part of the new genus. On page 40 he listed, beside *Rana gibbosa*, the names *Rana bufonia*, *Bufo ventricosus*, *Bombinator ventricosus*, *Bombinator systoma* and *Pipa laevis* ; on page 65, in the list of specimens in the collection of the Wien Museum, he quoted the species *Rana ovalis*, *Rana gibbosa* and *Rana ventricosa* as members of the genus *Engystoma*. Therefore the following nominal species may be considered as the originally included species of the genus *Engystoma* Fitzinger, 1826, among which one may be chosen and designated as type-species of this genus : *Rana gibbosa* Linnaeus, 1758 ; *Rana bufonia* Merrem, 1820 ; *Rana ventricosa* Linnaeus, 1758 ; *Rana systoma* Schneider, 1799 ; *Bufo laevis* Daudin, 1802 ; *Rana ovalis* Schneider, 1799.

Source MNHN, Paris

(3) WAGLER (1830 : 205) proposed the replacement name *Systoma* for *Engystoma* Fitzinger, 1826. He included in it only one nominal species, "*Breviceps gibbosus* Merr." (which he considered synonym of "*Rana Systoma* Schn. Daud."), but did not formally designate it as type-species of this genus.

(4) TSCHUDI (1838 : 49, 86) used the generic name *Systoma* Wagler, 1830, which he considered synonym of *Breviceps* Merrem, 1820 and of *Engystoma* Fitzinger, 1826, for the nominal species *Rana systoma* Schneider, 1799, *Rana gibbosa* Linnaeus, 1758 and "*Breviceps leschenaulti* Bibron" (nomen nudum) He did not designate a type-species for the genus.

(5) DUMÉRIL & BIBRON (1841 : 738–746) used the generic name *Engystoma* Fitzinger, 1826 for five nominal species, and were the first authors to make a designation of type-species valid in the light of the present *Code,* using the word "type" : they chose the species *Rana ovalis* Schneider, 1799 (DUMÉRIL & BIBRON, 1841 · 740). This species being one of the originally included species of the genus, this designation is valid.

(6) FITZINGER (1843 : 33) retained the replacement name *Systoma* Wagler, 1830 for the genus he had created under the name *Engystoma* Fitzinger, 1826. For this genus he designated the species *Rana gibbosa* Linnaeus, 1758 as type-species. This designation is not valid, being posterior to that of DUMÉRIL & BIBRON (1841) for *Engystoma* : *Systoma* being a replacement name for *Engystoma*, both nominal genera have the same type-species, namely *Rana ovalis* Schneider, 1799.

(7) Following DUMÉRIL & BIBRON (1841), various authors, including GÜNTHER (1859 : 51), BOULENGER (1882 : 160), COPE (1875 : 30 ; 1887 : 18 ; 1889 : 385), GADOW (1901 : 231) and others, used *Engystoma* Fitzinger, 1826 for *Rana ovalis* Schneider, 1799 and related species.

(8) STEJNEGER (1910) published a paper entitled : "The Amphibian generic name *Engystoma* untenable." He argued that *Engystoma* Fitzinger, 1826 was "based on Linné's *Rana gibbosa*" and was therefore a junior objective synonym of *Breviceps* Merrem, 1820 For *Rana ovalis* Schneider, 1799 and related species, he resurrected the generic name *Gastrophryne* Fitzinger, 1843 (type-species by original designation : *Engystoma rugosum* Duméril & Bibron, 1841).

(9) PARKER (1927) proposed a generic revision of the frogs which had previously been referred to the genus *Gastrophryne*, for which he recognized six distinct genera. In particular, he created the genus *Elachistocleis* for the two nominal species *Rana ovalis* Schneider, 1799 (which PARKER designated as type-species of this new genus) and *Oxyrhynchus bicolor* Guérin-Méneville, 1838[1].

(10) Since PARKER's (1927) work, and except for a few exceptions (ANDERSSON, 1945 : 2 ; BARTH, 1958 : 82 ; and possibly a few others), zoologists have given up using the generic name *Engystoma* Fitzinger, 1826 and have used the generic name *Elachistocleis* Parker, 1927 for *Rana ovalis* Schneider, 1799 and *Oxyrhynchus bicolor* Guerin-Méneville, 1838 (the latter being considered synonym of the former by some authors) The following authors used the name *Elachistocleis* MERTENS (1929 : 286 ; 1930 163 ; 1957 : 47) ; CRAWFORD (1931 : 38) ; DUNN (1931 : 416 ; 1949 : 2) ; PARKER (1933 : 3; 1934 : 120) ; FREIBERG (1942: 220 ; 1951 ·

1. Contrary to what is stated in FROST (1985 : 379), the author of this name is GUÉRIN-MÉNEVILLE (1838 : 17), not "VALENCIENNES (1838)"

Source MNHN, Paris

330) ; MYERS (1942 : 155) ; PENTZ (1943. 182); SCHMIDT & INGER (1951 : 448) , BOKERMANN (1952 : 279 ; 1966 : 34) ; TAYLOR (1952 : 594) ; ARÁMBURU (1953 : 273) ; CARVALHO (1954 : 3) ; GRIFFITHS (1954 · 42) ; COCHRAN (1954 : 362 ; 1961 : 62) ; CEI (1955 : 291 ; 1956 : 65 ; 1968 : 211 , 1980 : 62) ; BARTH (1958 · 82) ; GINÉS (1959 : 140) ; LEGRAND (1959 : 49) ; STEBBINS & HENDRICKSON (1959 : 538) ; GANS (1960 : 290) ; RIVERO (1961 : 177 , 1966 a : 304 ; 1966 b : 493) ; CEI & ROIG (1961 : 34) ; ACHENBACH (1962 : 265) ; SICK (1965 : 81) ; GALLARDO (1966 · 77 ; 1979 : 301) ; SAVAGE (1966 : 728) ; NELSON (1967 : 3719B ; 1968 : 170 ; 1972 : 897 ; 1973 : 163) ; KENNY (1969 : 12) ; MEDEM (1969 : 160) ; COCHRAN & GOIN (1970 : 77) ; HUTCHISON (1971 : 119) ; NELSON & GUTTMAN (1973 : 424) ; TRUEB (1973 : 71) ; WALKER (1973 : 6) ; BRAUN & BRAUN (1974 : 35 ; 1976 : 4) ; GORHAM (1974 : 119) ; LESCURE (1975 : 79 ; 1976 : 512) ; BOGART & NELSON (1976 : 199) ; EMERSON (1976 · 547) ; DOWLING & DUELLMAN (1978 40.2) ; DUELLMAN (1979 : 18) ; HOOGMOED (1979 273) ; LAURENT (1979 : 60 ; 1986 : 745) ; LYNCH (1979 : 193) ; RIVERO-BLANCO & DIXON (1979 : 290) ; TYLER (1979 : 87) ; HARDING (1983 : 47) ; DUBOIS (1984 : 15, 20–21, 40) ; FROST (1985 : 378) ; DUELLMAN & TRUEB (1986 : 552).

(11) In view of the fact that FITZINGER (1826) did not validly designate a type-species for his new genus *Engystoma*, and that DUMÉRIL & BIBRON (1841) validly designated *Rana ovalis* as type-species of this genus, *Engystoma* should be removed from the synonymy of *Breviceps*, where it erroneously stands since STEJNEGER's (1910) paper *Engystoma* Fitzinger, 1826 is in fact a senior objective synonym of *Elachistocleis* Parker, 1927 and should replace the latter as the valid name of the genus. Such a replacement would be inappropriate, since the name *Elachistocleis* has had a large use after its creation, and since the name *Engystoma* has been almost universally rejected since the creation of *Elachistocleis*. An action of the Commission is therefore needed in order to conserve the name *Elachistocleis*

(12) Two different kinds of action could be considered :

(a) The first one would be the suppression, under the plenary powers, of the generic names *Engystoma* Fitzinger, 1826, *Systoma* Wagler, 1830 (a replacement name of the latter) and also *Engistoma* Peracca, 1904 (an unjustified emendation of *Engystoma*), and the placement of the name *Elachistocleis* Parker, 1927 on the Official List. As shown below in (16), it would also be advisable in this case, although not absolutely necessary, to suppress the family-group names Engystomidae Bonaparte, 1850 (and Engystomina Bonaparte, 1850), Systomata Lichtenstein, 1856 and Engistomatidae Methuen & Hewitt, 1913. Thus the suppression of either three or six names by the Commission would be necessary in this case.

(b) The second possibility would be setting aside by the Commission of all previous designations of type-series for *Engystoma* (and its replacement names), including DUMÉRIL & BIBRON's (1841) valid designation, and designation by the Commission, under the plenary powers, of *Rana gibbosa* Linnaeus, 1758 as type-species of this genus This action would be equivalent to a validation of STEJNEGER's (1910) action considering FITZINGER's (1826) mention of *Rana gibbosa* as a "Reprasentant" of his genus *Engystoma* as a valid type-species designation for this genus In this case the name *Engystoma* and its replacement names would remain in the synonymy of *Breviceps* Merrem, 1820, where STEJNEGER (1910) had placed them, and the name *Elachistocleis* Parker, 1927 would remain valid. The family-group names mentioned above in (a) would disappear as junior synonyms, as discussed below in (15), so that no suppression of name would be needed. This second possibility of action is chosen here, because it is far more economic than the first one.

Source MNHN, Paris

(13) Following STEJNEGER (1910), PARKER (1934) considered *Engystoma* Fitzinger, 1826 a junior synonym of *Breviceps* Merrem, 1820. For the subfamily accomodating this genus he strangely used the name Brevicipitinae, which he credited to COPE (1867), instead of two other older family-group names mentioned by him : Systomata Lichtenstein, 1856 and "Engystomatidae Gunther, 1858". Since then the name Brevicipitinae has remained in use as the valid name of the subfamily : see e.g GOIN & GOIN (1962 : 234) , POYNTON (1964 : 69) ; WAGER (1965 : 40) ; VAN DIJK (1966 : 247) ; LYNCH (1973 : 117) ; SAVAGE (1973 : 354) ; BOGART & NELSON (1976 : 201) , DOWLING & DUELLMAN (1978 : 40.3, under the incorrect spelling Brevicipinae) , GOIN, GOIN & ZUG (1978 : 228) ; LAURENT (1979 60 ; 1980 a : 412 ; 1980 b : 86 , 1986 : 749) ; BOGART & TANDY (1981 : 59, under the incorrect spelling Brevicepinae) ; MORESCALCHI (1981 : 44) ; DUBOIS (1983 : 275 , 1984 40 ; 1985 : 75) ; FROST (1985 : 355) ; DUELLMAN & TRUEB (1986 : 552).

(14) As a matter of fact, all authors until 1979 have overlooked the family-group names created by BONAPARTE in a table (1850 ; reprinted in article form in 1852) in a work which was recently rediscovered (DUBOIS, 1981, 1982). BONAPARTE (1850) was the first author to propose family-group names based on the generic names *Breviceps* Merrem, 1820 and *Engystoma* Fitzinger, 1826 : he created the name Engystomidae for a family including three subfamilies, one of which he called Engystomina ; besides, he created the name Brevicipitina for a subfamily of his family Bufonidae.

(15) If the generic name *Engystoma* Fitzinger, 1826 remains, after action of the Commission, an objective synonym of *Breviceps* Merrem, 1820, the family-group names Brevicipitinae and Engystomatinae are also objective synonyms. Since both names were created in the same publication by BONAPARTE (1850), a first-reviser action is needed to decide upon their relative priority. I therefore took such an action (DUBOIS, 1983 : 275, 1984 : 40) and selected the name Brevicipitinae Bonaparte, 1850, in order to maintain the stability of the nomenclature of this subfamily (see (13) above). The name Engystomatinae Bonaparte, 1850 therefore automatically disappeared as a junior objective synonym of Brevicipitinae and its existence does not threaten the stability of nomenclature. The same applies to the family-group names Systomata Lichtenstein, 1856 and Engistomatidae Methuen & Hewitt, 1913, names which are based upon generic names which are substitute names for *Engystoma* Fitzinger, 1826.

(16) If the Commission refused to follow the suggestion made above, and if *Engystoma* Fitzinger, 1826 remained an objective senior synonym of *Elachistocleis* Parker, 1927, the name Engystomatinae Bonaparte, 1850 would become a junior subjective synonym of Microhylinae Gunther, 1858 (1843), the name traditionally used for this subfamily Thus its existence would not cause a threat to the stability of nomenclature. However, if new family-groups were to be created (for example if the subfamily Microhylinae was to be subdivided into several tribes), the name Engystomatinae would remain available for the group including *Rana ovalis* Schneider, 1799. If, on the other hand, the name *Engystoma* Fitzinger, 1826 had been suppressed by the Commission, it would be unadvisable to use the name Engystomatinae for the family-group including the genus *Elachistocleis* Parker, 1927 To avoid such possible difficulties, it would therefore be justified to ask the Commission to suppress, beside the generic names *Engystoma*, *Systoma* and *Engistoma*, the family-group names Engystomidae Bonaparte, 1850 (and Engystomina Bonaparte, 1850 , Systomata Lichtenstein, 1856 and Engistomatidae Methuen & Hewitt, 1913. This would make the solution discussed above in (12a) even heavier, and this reason strengthens the case for choosing the solution (12b).

Source MNHN, Paris

(17) A few words must be said about the familial name Microhylidae. The family-group name Microhylinae was coined by NOBLE (1931 : 537) for a subfamily including the genus *Microhyla* Tschudi, 1838 and related genera. For the family he used the name Brevicipitidae. PARKER (1934 : 15-16) remarked that the two oldest family-group names available for this family were Hylaedactyli Fitzinger, 1843 and Gastrophrynae Fitzinger, 1843. PARKER (1934 : 16) took a first-reviser action concerning these two names, by selecting the latter against the former. However, both these family-group names were based on generic names considered by PARKER (1934) as junior synonyms of valid names. *Gastrophryne* Fitzinger, 1843 was placed by him in the synonymy of *Microhyla* Tschudi, 1838, and consequently PARKER (1934 : 16) replaced the name Gastrophrynae Fitzinger, 1843 by the name Microhylidae as the valid name of the family. He was followed by all authors until now, and the name Microhylidae is universally used by present-days batrachologists : see e.g., among many others, BOURRET (1942 : 479), LIU (1950 : 231) ; TAYLOR (1952 : 594 ; 1962 : 539) ; COCHRAN (1954 : 1) ; GRIFFITHS (1954 : 37 ; 1959 : 473 ; 1963 : 273) ; INGER (1954 : 414 ; 1966 : 116 ; 1967 : 370) ; REIG (1958 : 115) ; RIVERO (1961 : 177) ; GOIN & GOIN (1962 : 197) ; POYNTON (1964 : 69) ; OKADA (1966 : 41) ; COCHRAN & GOIN (1970 : 74) ; ESTES & REIG (1973 : 37) ; LYNCH (1973 : 135 ; 1979 : 192) ; SAVAGE (1973 : 352) ; STARRETT (1973 : 251) ; TRUEB (1973 : 71) ; DUBOIS (1974 : 352 ; 1983 : 274 ; 1984 : 38 ; 1985 : 75) ; GORHAM (1974 : 115) ; DUELLMAN (1975 : 5 ; 1979 : 3) ; DOWLING & DUELLMAN (1978 : 40.1) ; GOIN, GOIN & ZUG (1978 : 69) ; GUIBÉ (1978 : 92) ; HOOGMOED (1979 : 251) ; LAURENT (1979 : 56 ; 1980 a : 410 ; 1980 b : 85 ; 1986 : 736) ; TYLER (1979 : 79) ; CEI (1980 : 152) ; HARDING (1983 : 46) ; FROST (1985 : 349) ; DUELLMAN & TRUEB (1986 : 549). The name Gastrophrynae having been changed into Microhylidae on the basis of a subjective synonymy of the generic names *Gastrophryne* and *Microhyla*, and the name Microhylidae having won general acceptance since then, the latter name must be maintained as the valid name of the family by virtue of Art. 40(a). This name takes the date of the rejected name (Art. 40b), and should logically be quoted as Microhylidae Noble, 1931 (1843) ; similarly, the nominotypical subfamily should logically be known as Microhylinae Noble, 1931 (1843) (see DUBOIS, 1983, 1984). However, as a result of the recent wordings of Articles 32 and 35 of the *Code* (ANONYMOUS, 1985), which I criticized in detail elsewhere (DUBOIS, 1985), the names Microhylidae and Microhylinae must now be credited to GÜNTHER (1858), who had created the taxa names Micrhylina and Micrhylidae, both based on the genus-group name *Micrhyla* Dumeril & Bibron, 1841, an unjustified emendation of *Microhyla* Tschudi, 1838 (for more details see DUBOIS, 1984, 1985, 1987).

(18) To conclude, the International Commission on Zoological Nomenclature is requested :

(1) to use its plenary powers to set aside all previous type species designations for the genus *Engystoma* Fitzinger, 1826, and to designate the nominal species *Rana gibbosa* Linnaeus, 1758 as type-species of this genus ;

(2) to place the following names on the Official List of Generic Names in Zoology :

(a) *Breviceps* Merrem, 1820, type-species, by monotypy, *Rana gibbosa* Linnaeus, 1758 ;

(b) *Microhyla* Tschudi, 1838, type-species, by monotypy, *Microhyla achatina* Tschudi, 1838 ;

BIBL. DU MUSEUM PARIS

Source : MNHN, Paris

(c) *Elachistocleis* Parker, 1927, type-species, by original designation, *Rana ovalis* Schneider, 1799 ;

(3) to place the following names on the Official List of Specific Names in Zoology :

(a) *gibbosa* Linnaeus, 1758, as published in the binomen *Rana gibbosa* (type-species of *Breviceps* Merrem, 1820) ;

(b) *achatina* Tschudi, 1838, as published in the binomen *Microhyla achatina* (type-species of *Microhyla* Tschudi, 1838) ;

(c) *ovalis* Schneider, 1799, as published in the binomen *Rana ovalis* (type-species of *Elachistocleis* Parker, 1927) ;

(4) to place the following names on the Official List of Family-Group Names in Zoology :

(a) Microhylidae Gunther, 1858 (1843), type-genus *Microhyla* Tschudi, 1838 ;

(b) Brevicipitina Bonaparte, 1850, type-genus *Breviceps* Merrem, 1820.

Résumé

Duméril & Bibron (1841) s'averent être les premiers auteurs à avoir effectué une désignation valide d'espèce-type, en l'occurrence *Rana ovalis* Schneider, 1799, pour le genre nominal *Engystoma* Fitzinger, 1826. Il en résulte que le nom *Engystoma* est en fait le nom valide pour le genre de Microhylidae actuellement connu sous le nom *Elachistocleis* Parker, 1927. Les conséquences nomenclaturales de ce fait sont discutées, et il est demandé à l'ICZN de faire usage de ses pleins pouvoirs pour désigner l'espece nominale *Rana gibbosa* Linné, 1758 comme espèce-type du genre *Engystoma*, de manière a résoudre ces problèmes.

Literature cited

Anonymous, 1985 – *International code of zoological nomenclature* Third edition. London, International Trust for zoological Nomenclature · i-xx + 1-338

Achenbach, G M , 1962 – Contribucion al conocimiento de Batracios que viven en el departamento de La Capital de la provincia de Sante Fe (Republica Argentina). *In Anais do Segundo Congresso Latino Americano de Zoologia*, **2** · 261–285.

Andersson, L G , 1945. – Batrachians from East Ecuador. *Ark. Zool* , **37 A** (2) . 1–88

Arámburu, A S. A de, 1953 – El genero *Hypopachus* Keferstein en la Argentina Batrachia : Salientia). *Notas del Museo Peron*, **16** (Zool. 144) : 271–285.

Barth, R., 1958 – A faune do Parque nacional do Itatiaia. *Bol. Parq. nac. Itatiaia*, **6** : 1–150.

Bogart, J P & Nelson, C. E , 1976 – Evolutionary implications from karyotypic analysis of frogs of the families Microhylidae and Rhinophrynidae *Herpetologica*, **32** 199–208

Bogart, J. P. & Tandy, M , 1981. - Chromosome lineages in African ranoid frogs. *Mont zool ital* , n. s.), **16**, suppl. . 55 91.

Bokermann, W. C A , 1952 – Microhylidae da colecao do departamento de Zoologia Amphibia Anura). *Pap. avul. Dep Zool.*, **10** 271–292, 4 pl

----- 1966. – *Lista anotada das localidades tipo de Anfibios brasileiros* Sao Paulo, RUSP . 1–183

Bonaparte, C. L., 1850. – *Conspectus systematum Herpetologiae et Amphibiologiae* Editio altera reformata Lugduni Batavorum, Brill . 1 pl

Source MNHN, Paris

----- 1852. – Conspectus systematum Herpetologiae et Amphibiologiae. *Nuovi Ann. Sci nat Bologna*, (3), **5** : 477–480.

BOULENGER, G. A., 1882 – *Catalogue of the Batrachia Salientia s Ecaudata in the collection of the British Museum*. London, Taylor & Francis : i-xvi + 1–503, pl I-XXX

BOURRET, R , 1942. – *Les Batraciens de l'Indochine* Hanoï, Institut océanographique de l'Indochine : i-x + 1–547, 4 pl.

BRAUN, P. C & BRAUN, C. A. S , 1974 – Fauna da fronteira Brasil-Uruguai, lista dos Anfíbios dos departamentos de Artigas, Rivera e Cerro Largo. *Iheringia*, (Zool.), **45** : 34–49.

----- 1976. – Contribuição ao estudo da fauna anfibiológica de região metropolitana (Grande Porto Alegre), Rio Grande do Sul, Brasil. *Com. Mus. Ci. PUCRGS, Porto Alegre*, **10** : 1–16.

CARVALHO, A. L. DE, 1954. – A preliminary synopsis of the genera of American microhylid frogs. *Occ Pap. Mus. Zool. Univ. Michigan*, **555** : 1–20, pl. I.

CEI, J M , 1955 – Chacoan Batrachians in central Argentina. *Copeia*, **1955** · 291–293, pl. I–II.

----- 1956. – Nueva lista sistematica de los Batracios de Argentina y breves notas sobre su biologia y ecologia. *Inv. Zool. chil.*, **3** : 35–68, pl. I–IX.

----- 1968. – Distribution et specialisation des Batraciens sud-americains *In : Biologie de l'Amerique australe*, Paris, CNRS, **4** : 199–214.

----- 1980 – Amphibians of Argentina *Monit. zool. ital* , (n s.), monogr **2** : i-xii + 1–609, pl 1–16 + 1–24.

CEI, J. M. & ROIG, V. G., 1961. – Batracios recolectados por la expedición biologica Erspamer en Corrientes y Selva Oriental de Misiones. *Notas biol. Fac Ci. Corrientes*, (Zool.), **1** : 1–40.

COCHRAN, D. M , 1954 – Frogs of Southeastern Brazil. *U S. nat Mus Bull* , **206** : i-xvi + 1–423, pl. 1–34.

----- 1961 – Type specimens of Reptiles and Amphibians in the U. S. national Museum. *U. S nat Mus. Bull.*, **220** : i-xv + 1-291.

COCHRAN, D. M. & GOIN, C. J., 1970. – Frogs of Columbia *U S. nat. Mus. Bull* , **288** . i-xii + 1–655.

COPE, E. D., 1867. – On the families of the raniform Anura. *J Acad nat Sci. Phila* , (2), **6** : 189–206.

----- 1875. – Check-list of North American Batrachia and Reptilia. *Bull. U. S. nat. Mus* , **1** : 1–104

----- 1887 – Catalogue of Batrachians and Reptiles of Central America and Mexico. *Bull. U S. nat. Mus.*, **32** : 1–98.

----- 1889 – The Batrachia of North America. *Bull. U. S. nat. Mus.*, **34** · 1–525, pl. I LXXXVI.

CRAWFORD, S. C , 1931. – Field keys to the Lizards and Amphibians of British Guiana. *Ann Carnegie Mus.*, **21** : 11–42

DOWLING, H G. & DUELLMAN, W. E., 1978 – Systematic herpetology : a synopsis of families and higher categories. *Publications in Herpetology*, Hiss Publications, New York, **7** . i-vii + 1.1–118.3 + i-viii.

DUBOIS, A., 1974. – Liste commentee d'Amphibiens recoltes au Nepal. *Bull. Mus. nat. Hist. nat.*, (3), **213** (Zool. 143) : 341–411.

----- 1981. – Liste des genres et sous-genres nominaux de Ranoidea (Amphibiens Anoures) du monde, avec identification de leurs espèces-types · consequences nomenclaturales. *Monit. zool. ital* , (n. s.), **15**, suppl. : 225–284.

----- 1982. – *Dendrobates* Wagler, 1830 and Dendrobatidae Cope, 1865 (Amphibia, Anura) · proposed conservation. *Bull. zool. Nom* , **39** : 267–278

----- 1983. – Classification et nomenclature supragénerique des Amphibiens Anoures. *Bull Soc linn Lyon*, **52** : 270–276.

----- 1984. – La nomenclature supragénérique des Amphibiens Anoures *Mém Mus. nat. Hist nat* , (A), **131** · 1–64

----- 1985. – Miscellanea nomenclatorica batrachologica (VII). *Alytes*, **4** : 61–78.

----- 1987. – Living amphibians of the world : a first step towards a comprehensive checklist. *Alytes*, **5** : 99–149.

DUELLMAN, W. E , 1975. – On the classification of frogs. *Occ Pap Mus nat. Hist. Univ. Kansas*, **42** : 1–14.

----- 1979 – The South American herpetofauna . a panoramic view. *Monogr Mus. nat. Hist. Univ. Kansas*, **7** : 1–28.

DUELLMAN, W. E. & TRUEB, L., 1986 – *Biology of Amphibians* New York, McGraw-Hill · i-xix + 1–670

Source MNHN, Paris

DUMÉRIL, A.-M.-C. & BIBRON, G., 1841 – *Erpetologie generale ou histoire naturelle complete des Reptiles* 8. Paris, Roret : i-vii + 1–792.

DUNN, E R., 1931 – The Amphibians of Barro Colorado Island *Occ Pap Boston Soc nat Hist*, **5** . 403–421.

----- 1949. – Notes on South American frogs of the family Microhylidae. *Am. Mus Novit*, **1419** : 1–21

EMERSON, S. B , 1976. – A preliminary report on the superficial throat musculature of the Microhylidae and its possible role in tongue action. *Copeia*, **1976** : 546–551.

ESTES, R & REIG, O. A , 1973. – The early fossil record of frogs : a review of the evidence *In* . VIAI (1973) : 11–63.

FITZINGER, L. I., 1826. – *Neue Classification der Reptilien.* Wien, Heubner : i-viii + 1–66, 1 tab

----- 1843. – *Systema Reptilium.* Fasciculus primus. *Amblyglossae* Vindobonae, Braumuller & Seidel . 1–106 + i-ix.

FREIBERG, M. A., 1942. – Enumeracion sistematica y distribucion geografica de los Batracios argentinos. *Physis*, **19** : 219–240.

----- 1951 – Sobre la distribución geografica de *Elachistocleis ovalis bicolor* (Valenciennes) *Physis*, **20** . 330–331.

FROST, D. R. (ed.), 1985. – *Amphibian species of the world* Lawrence, Allen Press & Assoc. Syst. Coll. . [i-iv] + i-v + 1–732.

GADOW, H , 1901. – *Amphibia and Reptiles* London, Macmillan & Co i xiii + 1–668, 1 pl

GALLARDO, J. M , 1966. – Zoogeografia de los Anfibios chaqueños *Physis*, **26** : 67–81.

----- 1979. – Composición, distribucion y origen de la herpetofauna chaquena. *Monogr Mus. nat Hist Univ. Kansas*, **7** : 299–307.

GANS, C., 1960 – Notes on a herpetological collecting trip through the Southeastern lowlands of Bolivia. *Ann. Carnegie Mus.*, **35** : 283–314

GINÉS, H , 1959. – Familias y géneros de Anfibios Amphibia, de Venezuela. *Mem Soc. Ci nat La Salle*, **19** : 84–146

GOIN, C. J. & GOIN, O. B., 1962. *Introduction to herpetology* San Francisco & London, Freeman & Co : i-ix + 1–341.

GOIN, C. J., GOIN, O. B & ZUG, G. R , 1978 – *Introduction to herpetology* Third edition. San Francisco, Freeman & Co. : i-xiii + 1–378.

GORHAM, S. W., 1974. – *Checklist of world Amphibians up to January 1, 1970* Saint John, The New Brunswick Museum : 1–173.

GRIFFITHS, I , 1954. – On the "otic element" in Amphibia Salientia. *Proc zool Soc Lond*, **124** 35–50, pl. 1–4.

----- 1959. – The phylogeny of *Sminthillus limbatus* and the status of the Brachycephalidae (Amphibia Salientia). *Proc. zool Soc Lond*, **132** : 457–487, pl 1–4

----- 1963. – The phylogeny of the Salientia. *Biol. Rev.*, **38** : 241–292.

GUÉRIN-MÉNEVILLE, F E , 1838 – *Iconographie du Regne Animal de G Cuvier* Tome III Texte explicatif. *Reptiles.* Paris, Baillière : 1–24, pl. 1–30.

GUIBÉ, J., 1978. – Les Batraciens de Madagascar. *Bonn. zool Monogr.*, **11** : 1–144, pl 1–82.

GÜNTHER, A , 1858 – On the systematic arrangement of the tailless Batrachians and the structure of *Rhinophrynus dorsalis. Proc zool. Soc. Lond.*, **1858** : 339–352.

----- 1859. – *Catalogue of the Batrachia Salientia in the collection of the British Museum* London, Taylor & Francis : i-xvi + 1–160, pl. I-XII

HARDING, K. A., 1983. – *Catalogue of New World Amphibians* Oxford, Pergamon Press i-xv + 1–406.

HOOGMOED, M. S., 1979. – The herpetofauna of the Guianan region. *Monogr Mus. nat Hist Univ Kansas*, **7** : 241–279.

HUTCHISON, V. H., 1971. Herpetological expedition to Columbia *National Geographic Society Research Reports*, 1965 Projects : 113–122.

INGER, R. F., 1954. Systematics and zoogeography of Philippine Amphibia *Fieldiana Zool.*, **33** : 183–531

----- 1966 – The systematics and zoogeography of the Amphibia of Borneo *Fieldiana . Zool*, **52** . 1–402.

----- 1967. – The development of a phylogeny of frogs *Evolution*, **21** . 369–384.

KENNY, J. S , 1969 – The Amphibia of Trinidad *Stud. Fauna Curaçao Caribb. Isl*, **29** (54) : 1 78, pl. I-XV.

LAURENT, R F , 1979 – Herpetofaunal relationships between African and South America *Monogr. Mus nat. Hist. Univ. Kansas*, **7** : 55–71.

Source MNHN, Paris

----- 1980 a. – Esquisse d'une phylogenèse des Anoures. *Bull. Soc. zool. France*, **104** : 397–422.
----- 1980 b. – Géonémie des Anoures. *C. r. Soc. Biogéogr.*, **56** : 81–86.
----- 1986. – Sous-classe des Lissamphibiens (Lissamphibia). Systématique. *In* : P.-P. GRASSÉ & M. DELSOL (eds.), *Traité de zoologie*, **14**, *Batraciens*, Fasc. I-B, Paris, Masson : 594–797.
LEGRAND, C. D., 1959. – Comunidades psamofilas de la region de Carrasco (Uruguay). *An. Mus. Hist. nat. Montevideo*, (2), **6** (7) : 1–63, pl. I-XXIII.
LESCURE, J., 1975. – Biogéographie et écologie des Amphibiens de Guyane française. *C. r. Soc. Biogéogr.*, **50** : 68–82.
----- 1976. – Contribution à l'étude des Amphibiens de Guyane française. VI. Liste préliminaire des Anoures. *Bull. Mus. nat. Hist. nat.*, (3), **377** (Zool. 265) : 475–524.
LIU, C.-C., 1950. – Amphibians of Western China. *Fieldiana : Zool. Mem.*, **2** : 1–400, pl. 1–10.
LYNCH, J. D., 1973. – The transition from archaic to advanced frogs. *In* : VIAL (1973) : 133–182.
----- 1979. – The Amphibians of the lowland tropical forests. *Monogr. Mus. nat. Hist. Univ. Kansas*, **7** : 189–215.
MEDEM, F., 1969. – El desarrollo de la herpetologia en Colombia. *Rev. Acad. colomb. Ci.*, **13** : 149–199.
MERREM, B., 1820. – *Versuch eines Systems der Amphibien.* Marburg, Johann Christian Krieger : 1–188 (× 2) + 189–191, 1 pl.
MERTENS, R., 1929. – Bemerkungen über einige brasilianische Froschlurche. *Blätter Aquarien Terrarienkunde*, **40** : 286–287, pl. 37–38.
----- 1930. – Amphibien und Reptilien. *Folia zool. hydrobiol.*, **1** : 161–166.
----- 1957. – Froschfang-Exkursionen in Brasilien. 2. São Paulo. *Aqu. Terr. Z.*, **10** : 47–52.
MORESCALCHI, A., 1981. – Karyology of the main groups of African frogs. *Monit. zool. ital.*, (n. s.), **15**, suppl. : 41–53.
MYERS, G. S., 1942. – Notes on some frogs from Peru and Ecuador. *Proc. biol. Soc. Wash.*, **55** : 151–155.
NELSON, C. E., 1967. – The evolution of frogs of the family Microhylidae in North America. *Diss. Abstr.*, **27** : 3719B.
----- 1968. – Ranas de la familia Microhylidae en la America del Norte. *IV Congreso Latinoamericano de Zoologia*, Caracas : 167–180.
----- 1972. – Distribution and biology of *Chiasmocleis panamensis* (Amphibia : Microhylidae). *Copeia*, **1972** : 895–898.
----- 1973. – Mating calls of the Microhylinae : descriptions and phylogenetic and ecological considerations. *Herpetologica*, **29** : 163–176.
NELSON, C. E. & GUTTMAN, S. I., 1973. – Serum protein electrophoresis of some Amphibia (Caecilidae, Rhinophrynidae, Microhylidae). *Com. Biochem. Physiol.*, **44B** : 423–428.
NOBLE, G. K., 1931. – *The biology of the Amphibia.* New York, Dover : i-xviii + 1–577.
OKADA, Y., 1966. – *Fauna Japonica. Anura (Amphibia).* Tokyo, Biogeographical Society of Japan : i-xii + 1–234, pl. I-XXIV.
PARKER, H. W., 1927. – The brevicipitid frogs allied to the genus *Gastrophryne. Occ. Pap. Mus. Zool. Univ. Michigan*, **187** : 1–6, pl. I.
----- 1933. – A list of the frogs and toads of Trinidad. *Tropical Agriculture*, **10** : 8–12.
----- 1934. – *A monograph of the frogs of the family Microhylidae.* London, British Museum : i-viii + 1–208.
PENTZ, K., 1943. – The cranial morphology of the neotropical microhylid (Anura) *Elachistocleis ovalis* (Schneider). *South. Afr. J. Sci.*, **39** : 182–226.
POYNTON, J. C., 1964. – The Amphibia of Southern Africa : a faunal study. *Ann. Natal Mus.*, **17** : 1–334.
REIG, O. A., 1958. – Proposiciones para una nueva macrosistematica de los Anuros. *Physis*, **21** : 109–118.
RIVERO, J. A., 1961. – Salientia of Venezuela. *Bull. Mus. comp. Zool. Harvard Coll.*, **126** : 1–207, 1 pl.
----- 1966 a. – Salientios (Amphibia) en la colección de la Sociedad de Ciencias Naturales La Salle de Venezuela. *Caribb. J. Sci.*, **4** : 297–305.
----- 1966 b. – The distribution of Venezuelan frogs. VI. The LLanos and the Delta Region. *Caribb. J. Sci.*, **4** : 491–495.
RIVERO-BLANCO, C. & DIXON, J. R., 1979. – Origin and distribution of the herpetofauna of the Dry Lowland Regions of Northern South America. *Monogr. Mus. nat. Hist. Univ. Kansas*, **7** : 281–298.
SAVAGE, J. M., 1966. – The origins and history of the Central American herpetofauna. *Copeia*, **1966** : 719–766.

Source : MNHN, Paris

----- 1973. – The geographic distribution of frogs : patterns and predictions. *In* : VIAL (1973) : 351–445.

SCHMIDT, K. P. & INGER, R. F., 1951. – Amphibians and Reptiles of the Hopkins-Branner expedition to Brazil. *Fieldiana : Zool.*, **31** : 439–465.

SICK, H., 1965. – A fauna do Cerrado. *Arqu. Zool. São Paulo*, **12** : 71–93.

STARRETT, P. H., 1973. – Evolutionary patterns in larval morphology. *In* : VIAL (1973) : 251–271.

STEBBINS, R. C. & HENDRICKSON, J. R., 1959. – Field studies of Amphibians in Colombia, South America. *Univ. Calif. Publ. Zool.*, **56** : 493–540.

STEJNEGER, L., 1910. – The Amphibian generic name *Engystoma* untenable. *Proc. biol. Soc. Washington*, **23** : 165–167.

TAYLOR, E. H., 1952. – The frogs and toads of Costa Rica. *Univ. Kansas Sci. Bull.*, **35** : 577–942.

----- 1962. – The Amphibian fauna of Thailand. *Univ. Kansas Sci. Bull.*, **43** : 265–599.

TRUEB, L., 1973. – Bones, frogs, and evolution. *In* : VIAL (1973) : 65–132.

TSCHUDI, J. J., 1838. – *Classification der Batrachier, mit Berücksichtigung der fossilen Thiere dieser Abtheilung der Reptilien.* Neuchâtel, Petitpierre : 1–102, pl. I-VI.

TYLER, M. J., 1979. – Herpetofaunal relationships of South America with Australia. *Monogr. Mus. nat. Hist. Univ. Kansas*, **7** : 73–106.

VAN DIJK, D. E., 1966. – Systematic and field keys to the families, genera and described species of Southern African Anuran tadpoles. *Ann. Natal Mus.*, **18** : 231–286.

VIAL, J. L. (ed.), 1973. – *Evolutionary biology of the Anurans.* Columbia, Univ. Missouri Press : i-xii + 1–470.

WAGER, V. A., 1965. – *The frogs of South Africa.* Cape Town & Johannesburg, Purnell & Sons : i-vii + 1–242.

WAGLER, J., 1830. – *Natürliches System der Amphibien, mit vorangehender Classification des Säugethiere and Vögel.* München, Stuttgart & Tübingen, Cotta : i-vi + 1–354.

WALKER, C. F., 1973. – A new genus and species of microhylid frog from Ecuador. *Occ. Pap. Mus. nat. Hist. Univ. Kansas*, **20** : 1–7.

Source : MNHN, Paris

ALYTES

Journal International de Batrachologie
International Journal of Batrachology
édité par la Société Batrachologique de France

Rédacteurs : Alain DUBOIS et Jean-Jacques MORÈRE.

Adresse : Laboratoire des Reptiles et Amphibiens, Muséum national d'Histoire naturelle, 25 rue Cuvier, 75005 Paris, France.

Comité de rédaction : Jean-Louis AMIET (Yaoundé), Stephan D. BUSACK (Urbana), Benedetto LANZA (Firenze), Raymond F. LAURENT (Tucumán), Richard J. WASSERSUG (Halifax).

Recommandations aux auteurs. — *Alytes* publie des articles originaux en français ou en anglais, consacrés aux Amphibiens. Les manuscrits doivent être dactylographiés et accompagnés d'un résumé en anglais (abstract). Les articles en anglais seront suivis d'un résumé assez complet en français (pour ceux qui le souhaiteraient, les rédacteurs acceptent de revoir les résumés en français à partir d'un texte en anglais). Tableaux et figures doivent comporter un titre. Les figures, exécutées à l'encre noire, ne devront pas dépasser le format 16 × 24 cm. Indiquer leur numéro au crayon ; légendes sur feuille séparée. Présenter les références bibliographiques conformément au dernier numéro d'*Alytes* paru (les références de livres doivent comporter la pagination). Adresser les manuscrits en trois exemplaires aux rédacteurs. L'acceptation d'un article pour publication est décidée par les rédacteurs après lecture critique de celui-ci par deux lecteurs ou plus.

Instructions to authors. — *Alytes* publishes original papers in English or in French, dealing with Amphibians. Manuscripts should be typewritten, and preceded by an English abstract. Papers in English should be followed by a detailed French summary (for those who may wish so, the editors accept to revise such French summaries on the basis of an English text). Tables and figures should possess titles. Figures should be drawn in black ink and should not exceed 16 × 24 cm in size. Their numbers should be written in pencil. Figure captions should be assembled on a separate sheet. Bibliographic references should be presented as in recent issues of *Alytes* (book references should include the pagination). Send the manuscripts in triplicate to the editors (address above). Acceptance for publication will be decided by the editors following review by two referees or more.

Tirés à part. — 25 exemplaires gratuits par article. Au-delà, les tirés à part seront facturés par tranches de 25 exemplaires.

Publié avec le concours du Muséum national d'Histoire naturelle.

Directeur de la Publication : Alain DUBOIS.

Numéro de Commission Paritaire : 64851.

Source : MNHN, Paris

4 JAN. 1988

Alytes, 1987, **6** (1-2) : 1-84.

SOMMAIRE

Alain DUBOIS
Miscellanea taxinomica batrachologica (II) 1

Alain DUBOIS
Miscellanea nomenclatorica batrachologica (XVI) 10

Pierre JOLY
Le régime alimentaire des Amphibiens : méthodes d'étude 11

Miloš L. KALEZIĆ, Georg DŽUKIĆ, Jelka CRNOBRNJA & Nikola TVRTKOVIĆ
On the Triturus vulgaris schreiberi *problem : electrophoretic data* 18

Manuel POLLS PELAZ
On the identity of the so-called "algae like cells" in tadpole cultures of European green frogs (Rana ridibunda) 23

Alain DUBOIS
Again on the nomenclature of frogs 27

Alain DUBOIS
Discoglossidae Günther, 1858 (Amphibia, Anura) : proposed conservation ... 56

Alain DUBOIS
Strongylopus *Tschudi, 1838 (Amphibia, Anura) : request for the designation under the plenary powers of a type-species in agreement with current usage* 69

Alain DUBOIS
Elachistocleis *Parker, 1927 (Amphibia, Anura) : proposed conservation* 75

BIBLIOTHÈQUE MUSÉUM PARIS

Imprimerie Fotek, St.-Niklaas, Belgique.
Dépôt légal: 4ème trimestre 1987.

Source : MNHN, Paris